August · 1957

# Metal Products Manufacturing



including finish

SERVING THE *Appliance* AND FABRICATED METAL PRODUCTS INDUSTRY

FROM RAW METAL TO FINISHED PRODUCT

# EPON® RESIN does it!

## Tough primer on RCA WHIRLPOOL Washers

### withstands rugged washday punishment

**RCA WHIRLPOOL Washer cabinets** on storage conveyors. Finish system includes an Epon resin undercoat, formulated by Grand Rapids Varnish Corporation.

**Epon resin-based finish** plus careful inspection eliminate customer complaints.

## HERE'S HOW...

SOAPS AND MODERN high-strength detergents are persistent enemies of ordinary paint. Because of severe corrosive conditions in some geographical areas, home laundry appliances often show rust stains in just a few weeks of service.

Whirlpool-Seeger Corporation, St. Joseph, Michigan, has found that a primer based on Epon resin gives an outstandingly superior protective finish to its washers, driers, and other home laundry equipment. To maintain the highest standards for coatings, Whirlpool-Seeger set up a system of continuous quality-control testing in their finishing section.

*Epon resin-based primers, now standard on RCA WHIRLPOOL Washers, are credited with all but eliminating a major source of field complaints about coating failures.*

• • •

If you have a product finishing or paint maintenance problem, you, too, may find that Epon resin-based coatings will do the job better. They have excellent adhesion, high resistance to impact and abrasion, outstanding resistance to moisture, heat, and corrosives. Ask your supplier for Epon resin-based paints and enamels. Write for the full Epon resin coatings story: "*Planning to Paint a Pyramid?*"

SHELL

**SHELL CHEMICAL CORPORATION**

**CHEMICAL SALES DIVISION**

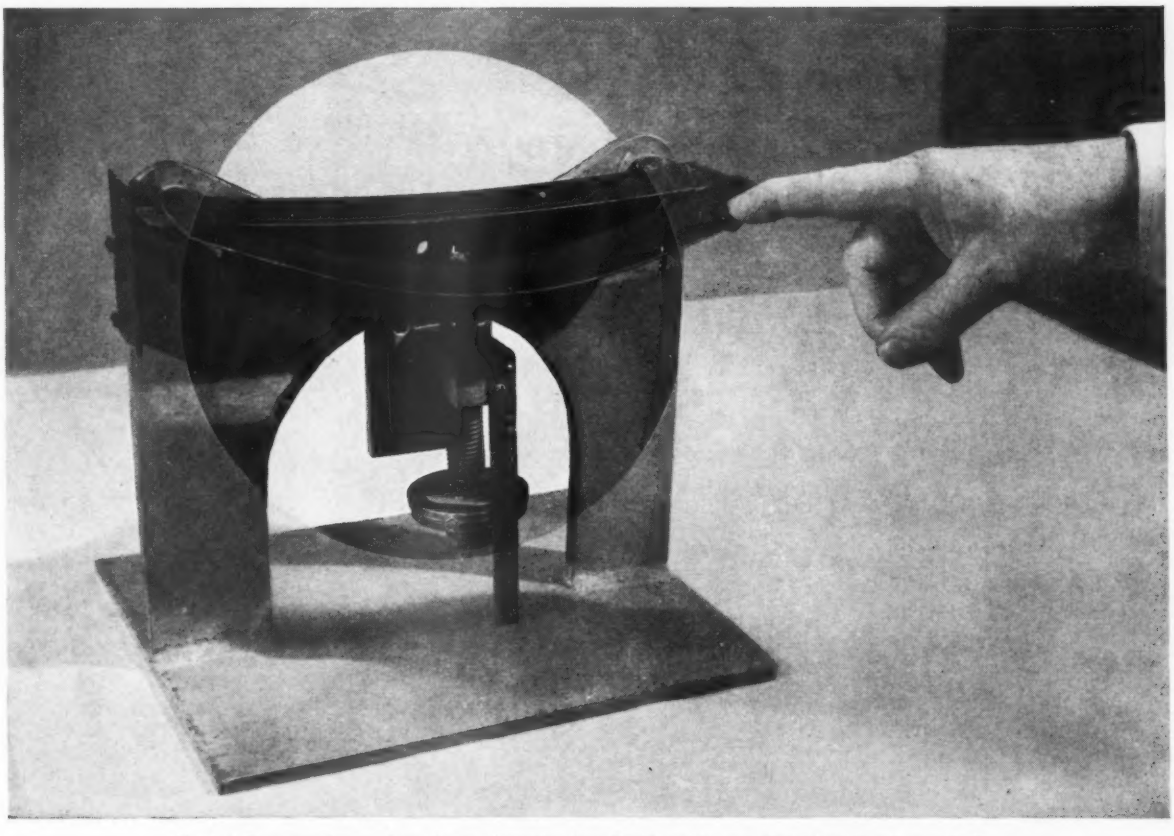
**380 Madison Avenue**
**New York 17, New York**

**Atlanta • Boston • Chicago**
**Cleveland • Detroit • Houston**
**Los Angeles • Newark • New York**
**San Francisco • St. Louis**

**IN CANADA**
**Chemical Division, Shell Oil Company of Canada, Limited**
**Toronto • Montreal • Vancouver**

*Epon resins are the epoxy polymers made exclusively by Shell Chemical Corp.*

# How Armco Enameling Iron Helps Keep Porcelain Enameled Parts "On Tolerance"



Fired at the same temperature: Armco Enameling Iron (back) resists sag; Plain steel (front) sags badly.

Armco Enameling Iron stubbornly holds its shape at all porcelain enamel firing temperatures. This dogged resistance to sag and distortion keeps dimensions accurate on porcelain enameled parts. Assembly goes fast and easy. Rejects are practically eliminated.

This special base metal for porcelain enameling also holds down rejects because it's commercially-pure iron. It contains a minimum of the gas-forming impurities that breed finish defects. Tiny "fingers" which are formed during firing on the specially-processed surface of Armco Enameling Iron hold porcelain enamel tightly.

## Made For Porcelain Enameling

There's good reason why all these advantages are consistently present in Armco Enameling Iron. It was specially created, continually improved, and is carefully produced to meet the specific needs of porcelain enamelers. That's why you can depend on its superior enameling qualities from sheet to sheet, order to order.

For complete information on Armco Enameling Iron, write us at the address below, or call the Armco Sales Office nearest you.

**ARMCO STEEL CORPORATION**

1667 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

# FASTEX

**your source for savings in**

## component design and production

Here, Perspective Engineering conceives and creates fasteners and components of metals and plastics for mass-assembly. Skilled craftsmen produce these parts by the millions in integrated manufacturing facilities. Through this unique combination of talent and machinery, industry is served with maximum design flexibility and production speed. Assembly time is saved, costs are reduced.

**FASTEX® PARTS PICTURED ABOVE ARE:** 1. Q Fasteners (T.M.), fasten with a quarter turn. 2. Plasti-Supports (T.M.), blind-assembly shelf supports. 3. Plasti-Grommets®, self-retaining blind screw receptacles. 4. Plasti-Plugs® improve product appearance. 5. Molding Clips are self-adjusting, vibration proof. 6. Plasti-Rivets®, one-piece, self-expanding for blind assembly. 7. Springrip Fasteners with internal teeth. 8. Plasti-Rings®, self-retaining plastic shaft retainers. 9. Precision Stamped Gears, complete range of types and sizes. 10. Speed Nuts®, economical self-retaining nuts. 11. Engineered Stampings speed assembly. 12. Plastinite® one-piece strain-relief grommets. 13. Nylon Spiroid® Gears offer new space and weight economies. 14. Engineered Molded Plastic Parts, low-cost, time-saving.

**FASTEX**

**DIVISION OF ILLINOIS TOOL WORKS**
195 Algonquin Road, Des Plaines, Illinois

In Canada:
SHAKEPROOF-FASTEX
Division of Canada
Illinois Tools, Ltd.
Toronto, Ontario

itw

*August • 1957*

**VOL. 14 • NO. 8**

# MPM

(including finish)

**MONTHLY TRADE PUBLICATION**
Established January 1944
*Published by*
**DANA CHASE PUBLICATIONS**
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## FEATURES



## DEPARTMENTS



## METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

**A trade publication** devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

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Accepted under the act of June 5, 1934, at Aurora, Illinois authorized January 7, 1948.

# H & K Perforated Materials

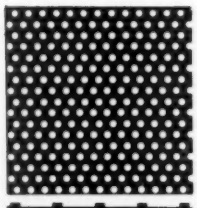
mean

## UTILITY · BEAUTY · ECONOMY

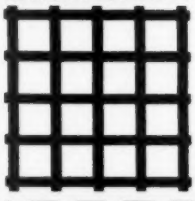
for

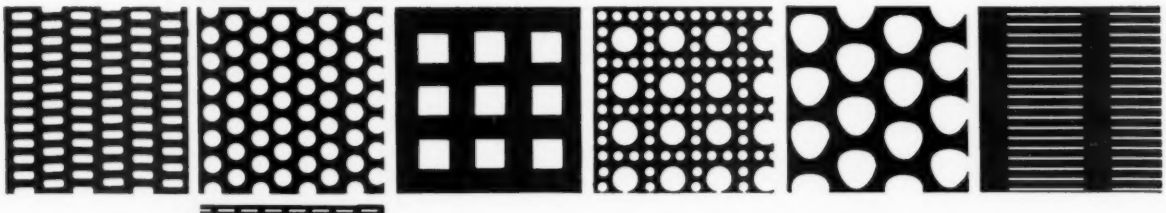
## TOMORROW'S PRODUCTS

Round Holes.....



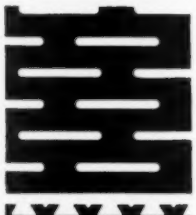
Square Holes.....



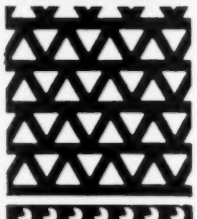


Slots.....

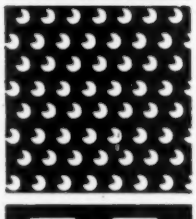
Oblong Holes.....



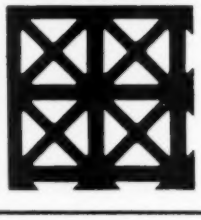
Triangles..



Decorative Designs...



In Thousands of Patterns...



### A *MEDIUM* OF LIMITLESS APPLICATIONS

Harrington & King perforated materials offer a challenge to men of ideas. Designers and stylists are discovering an ever-increasing range of applications for perforated materials. For functional or decorative purposes, or where a combination of both is essential, H & K perforated materials are used in more products, in more accessories, in more places than ever before.

### REDUCES TOOLING COSTS

The design, pattern and open area for almost every application may be selected from our thousands of perforating dies . . . at no charge for tooling. (If a special design is required, tools will be built to order.) In addition to the savings in tool costs, the perforating process itself is an economical method.

### MATERIALS PERFORATED BY H&K

Harrington & King can perforate practically any material that can be obtained in coils, sheets or plates . . . from foil-thin to 1" thick. Metallic materials—steel, aluminum, stainless steel, brass, copper, monel, zinc, bronze, etc. Non-metallic materials—plastics, wood composition, paper, cloth, etc.

**H&K engineers will be pleased to work with you on your requirements.**

***FILL-IN AND MAIL COUPON TO THE NEAREST H & K OFFICE***

THE Harrington & King PERFORATING CO., INC.

CHICAGO
5610 Fillmore Street
Chicago 44, Illinois

NEW YORK
114 Liberty Street
New York 6, N. Y.

Please send me ☐ GENERAL CATALOG NO. 62
☐ FOLDER OF DECORATIVE PATTERNS

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

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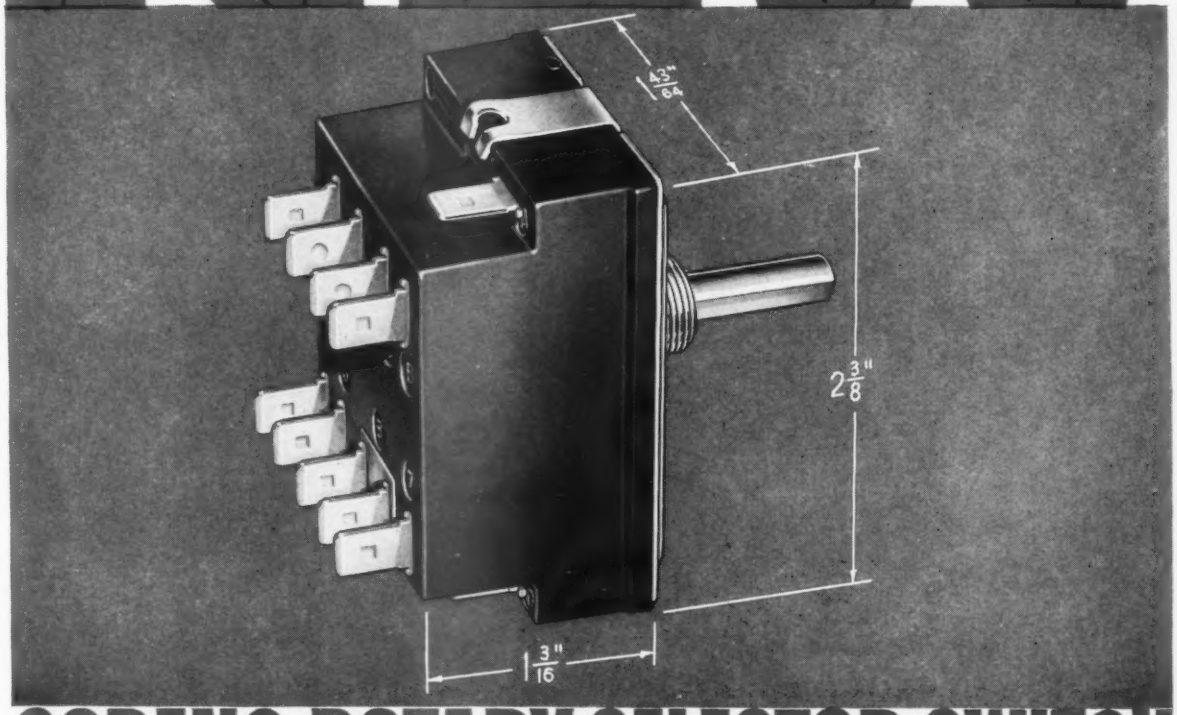
# NEW




# SORENG ROTARY SELECTOR SWITCH

## Offers Versatility-Economy Over Broad Range of Applications

**The features below point up the switching versatility possible with the Model 776 rotary selector switch. An economical choice for home laundry equipment, dishwashers, air conditioning, vending machines, etc., it is also rugged enough for the severe conditions of industrial application.**

### FEATURES

- Two SPDT and three SPST switches
- Shaft actuated push-pull switch
- Positive indexing up to eight positions with specially designed spring construction
- Snap action provided by spring loading
- Total shaft stroke 360°
- General purpose phenolic case
- Metal cover and ¼" shaft zinc dichromate plated
- Silver plated spade terminals
- Bussing available between any combination of terminals
- Bushing mounted (other mountings optional)

### RATING

10 AMP 125/250 V. A.C. ½ h.p. 125/250 V. A.C. Listed by Underwriter's Laboratories

FOR COMPLETE INFORMATION WRITE FOR BULLETIN ON MODEL 776

CC CONTROLS COMPANY OF AMERICA
Manufacturers of *SORENG* controls
9559 SORENG AVENUE • SCHILLER PARK, ILLINOIS

# check list

FOR PORCELAIN ENAMELERS

**METAL PREPARATION**

*Pickling Tanks · Pickling Baskets · Neutralizer Tanks*
*Filter Presses · Hoists · Sandblasting Equipment*
*Ferro-Curran Pickling Machines*

**MILL ROOM**

*Mills—production type · Mills—laboratory type · Mixers*
*Pumping Units · Agitators · Magnetic Separators*
*Rotosprays · Rotospray Parts · Sieves · Testing Equipment*
*Slump Tester · Pressure Tanks · Water Treatment Tanks*
*Sponges · Balls and Pebbles · Mill Lining Blocks*

**DIPPING & SPRAYING**

*Dipping Tanks · Dipping Machines · Flow Coating Systems*
*Brushing & Edging Equipment · Spray Booths · Spray Machines*
*Spray Guns & Accessories · Pressure Tanks · Rubbing Stones*

**DRYING & BRUSHING**

*Dryers—batch type · Dryers—automatic type · Dusters*
*Brushing Equipment—automatic · Brushes—edging, stencil, rimming*

**FIRING**

*Furnaces—box, continuous · Conveyors · Furnace Tools · Muffles*
*Brick, Tile · Temperature Gradient Recording Equipment*
*Pyrometers · Timers · Asbestos Mitts*

**LABORATORY**

*Furnaces · Ovens · Titrating Equipment · Reflectometers · Thickness Gauges*
*Testing Equipment · Balance · Sieves · Rotap · Microscopes*

*IF YOU DON'T HAVE OUR LATEST PRICE LIST, LET US MAIL YOU ONE!*

*CHECK FERRO FIRST ... your best source for all Porcelain enameling supplies and equipment*

FERRO

## FERRO CORPORATION

4150 East 56th Street, Cleveland 5, Ohio

In Canada: Ferro Enamels (Canada) Ltd., Oakville, Ontario

# THE MPM spotlight

**This new vacuum cleaner that "caddies" its accessory tools, and has "big wheel" mobility, is by Westinghouse Electric Corp. Known as Model MC-1, it is equipped with a combination floor and rug tool, crevice tool, drapery nozzle, dusting brush, and chrome steel extension tubes. The cleaner features an exhaust port, concealed by a side panel, which can convert to a blower for spraying paint.**

## INDUSTRY MEETINGS

### INSTRUMENT-AUTOMATION

Instrument Society of America's 12th Annual Instrument-Automation Conference and Exhibit, Cleveland Auditorium, Cleveland, Ohio. September 9-13.

### MECHANICAL ENGINEERS

Fall Meeting of The American Society of Mechanical Engineers, Statler Hotel, Hartford, Conn., September 23-25.

### PORCELAIN ENAMEL

Porcelain Enamel Institute's 26th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., October 3-5.

### ELECTRICAL ENGINEERS

American Institute of Electrical Engineers Fall General Meeting, Chicago, October 7-11.

### INDUSTRIAL HYDRAULICS

National Conference on Industrial Hydraulics, Armour Research Foundation & Illinois Institute of Technology, Hotel Sherman, Chicago, October 17-18.

### PACKAGING FORUM

Nineteenth Annual Forum of Packaging Institute, Hotel Statler, New York City, October 28-30.

### PAINT & VARNISH PRODUCTION

Thirty-fifth Annual Meeting of the Federation of Paint and Varnish Production Clubs, Bellevue-Stratford hotel, Philadelphia, Pa., November 1-2.

### METALLURGICAL

American Society of Metals' 2nd World Metallurgical Congress, Chicago, November 2-8.

### PEI SHOP FORUM

Porcelain Enamel Institute's 19th Annual Shop Practice Forum, Ohio State University, Columbus, Ohio, November 6-8.

### ELECTRICAL MANUFACTURERS

National Electrical Manufacturers' Association Annual Meeting, Traymore Hotel, Atlantic City, N. J., November 11-15.

### REFRIGERATING ENGINEERS

The American Society of Refrigerating Engineers Semi-Annual Meeting, Shoreland Hotel, Chicago, November 14-16.

# 100,000 Glass Lined Water Heaters *without a single failure*

One of our customers was very happy to report this splendid production record to us recently.

## Our No. 700 Water Heater Enamel is the answer . . .

The result of that all-important "KNOW-HOW" which comes from exhaustive laboratory research by our top flight ceramic engineers, working hand in hand with practical technicians, under actual production conditions in our own large job enameling plant.

## *ING-RICH "KNOW-HOW"*

has enabled us to produce this superior *FRIT* for Glass Lined Water Heaters, which provides:

1. **Greater Water Resistance**
2. **Less Porosity**
3. **Higher Percentage of One-Coat Applications**
4. **Wider Range of Firing Temperatures**
5. **More Workability**

Ing-Rich plant-tested ceramic engineers and plant-tested Frit can give you the results *you* want—there is no substitute for "Know-How."

**INGRAM-RICHARDSON, INC.**
Offices, Laboratory and Plant
FRANKFORT, INDIANA

ING-RICH
FRIT


### Wants reprint

Gentlemen: Please send me a reprint of "Milling With Chemicals" which appeared in the June, 1957 issue of your magazine.

**S. Weiner**
**M&P Engineer**
**Engineering Service, J-5**
**Westinghouse Electric Corp.**
**Meter Div., Newark, N. J.**

### A foreign reader

Gentlemen: I am a subscriber of your METAL PRODUCTS MANUFACTURING and found "Safe Transit" written in the April edition of 1957 very interesting. I should very much like to have a copy of the NST Committee's booklet entitled "Test Procedure," so I shall be very glad if you tell me the cost to cover the booklet and the earliest possible date as I can get it.

I am looking forward to be informed soon.

**M. Stephen Okada**
**Industrial Engineer**
**Tokyo Shibaura Electric Co.**
**Kawasaki, Japan**

Ed. Note: We have enclosed a booklet entitled "The National Safe Transit Program." This booklet includes an outline of the test procedures. Should you desire additional information, we suggest you contact the National Safe Transit Committee, 1145 Nineteenth Street, N. W., Washington 6, D. C.

### Finds reprint interesting

Gentlemen: In your June, '57 issue of METAL PRODUCTS MANUFACTURING, there is an article on page 64 entitled "The Electroplating of Zinc Die Castings." This article is No. 3. Would you please send me two copies of all three articles.

**Roger J. Browne, Jr.**
**Cadillac Motor Car Div.**
**General Motors Corp.**
**Detroit 32, Mich.**

Ed. Note: The article has been reprinted in its entirety. Two copies of the reprint have been mailed with our compliments.

### Weathering of Porcelain Enamels

Gentlemen: We should like you to consider this an order for a copy of the article entitled "Weathering of Porcelain Enamels Evaluated for Architectural Uses," which appeared in the June, 1957 issue of METAL PRODUCTS MANUFACTURING magazine.

Thank you for handling this for us. Please send bill and material marked for the attention of the writer.

**Corienne Casper**
**Librarian**
**U. S. Gypsum Co.**
**Chicago, Ill.**

Ed. Note: We regret that our supply of the June issue has been exhausted as the result of a particularly heavy demand. We are, however, mailing tearsheets of the article.

*to Page 22* →

## better living

When you make anything in metal for homes, kitchens and appliances, and you want enduring beauty and sales appeal in your product . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

**specify**

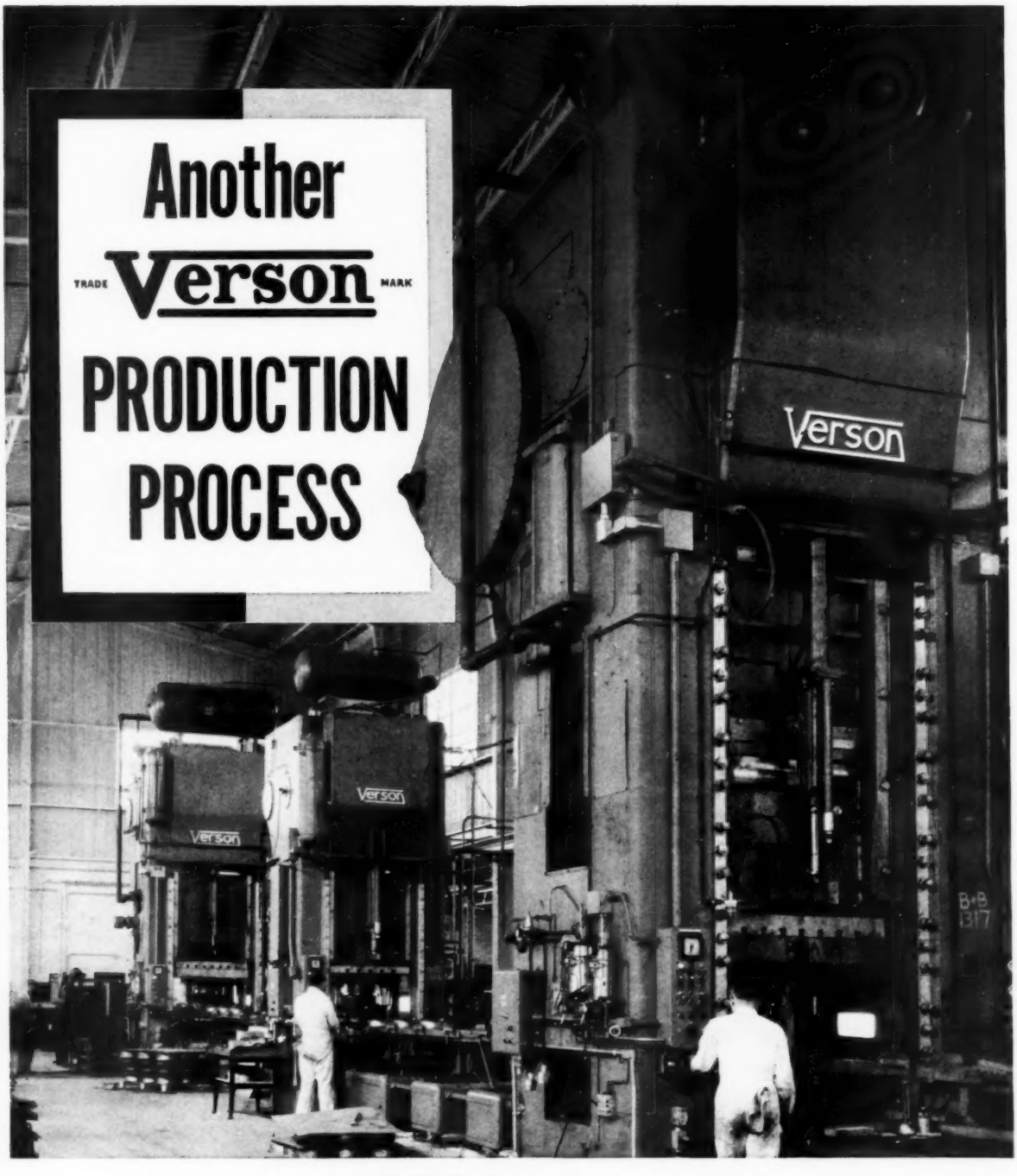
# McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

**for homes and home products**

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS




## Engineered and Developed by Verson to Make Manufacturing More Profitable

Here is a good example of what Verson engineering can do in automated press lines . . . and this is no theoretical concept . . . it is a tried and proven production process which has been in operation for one year.

Three Verson Eccentric Presses (1500, 200 and 600 tons respectively from front to rear in above photograph) are synchronized with automatic transfer and feeding equipment. The part produced is an automotive transmission drive housing.

As a manufacturer of both Transmat and automated press line processes and related tooling, Verson is well qualified to assist you in high production automatic stamping problems. For specific recommendations send an outline of your requirements. 163

**VERSON ALLSTEEL PRESS CO.** •

9320 S. Kenwood Ave. • Chicago 19, Illinois
8300 S. Central Expressway • Dallas, Texas

# WESTINGHOUSE another user of PERMA-VIEW WINDOWS

**Westinghouse—another leading appliance name using the leading oven-door window—PERMA-VIEW. Westinghouse—one of the 57 leading range manufacturers using PERMA-VIEW.**

ROUND

SQUARE

RECTANGULAR

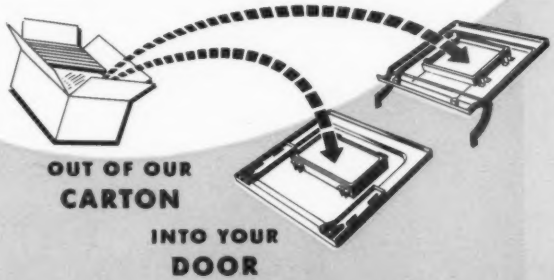
TRAPEZOID

*We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.*

Westinghouse has been a satisfied user of PERMA-VIEW windows for a number of years. Now 57 other leading manufacturers are using "the window you can see through always."

The strong, steel-encased, double-pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "No-Fog" window meets the constantly growing demand for "visible baking."

The PERMA-VIEW window is pre-engineered and comes to you ready for immediate installation in your range, "out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.

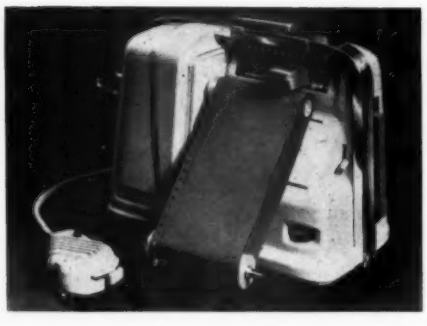



THIS IS A GENUINE PERMA-VIEW PATENTED NON-FOG WINDOW

**MILLS PRODUCTS INCORPORATED**

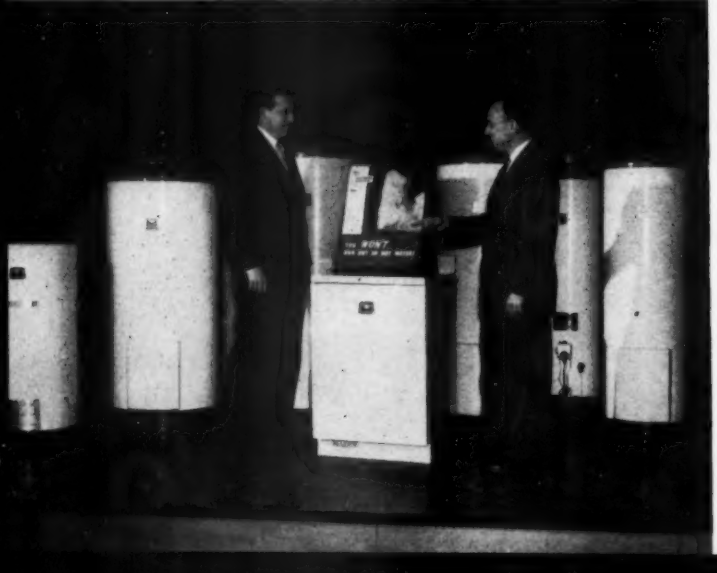
1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN

*AT U. S. STEEL'S HOMESTEAD WORKS, these "largest porcelain enamel panels yet used in architecture" are installed. The panels were manufactured by Ingram-Richardson Mfg. Co., Beaver Falls, Pa. There are two hundred of the 4-foot by 12-foot porcelain enamel panels. They are 1⅜" thick, each being composed of an exterior face of blue porcelain enamel and a back pan of 14 gauge painted steel with fibrous glass insulation.*



*ON COMPTOMETER dictation machine, a warning buzzer sounds when the user forgets to lower the recording head. The buzzer also works 10 seconds before the end of the belt is reached.*

*NEW WATER HEATER LINE by Plumbing and Heating division of American-Standard includes gas and electric, galvanized steel and glass-lined, and round and table top models. Here, models are inspected by Lincoln Pierce (left), general sales manager of the Plumbing and Heating division, and Clyde H. Wilkinson, manager of Water Heater Product Lines.*



## the MPM . . .

**on the theory that one photo equals one thous**
**ture will bring you many photos and few**

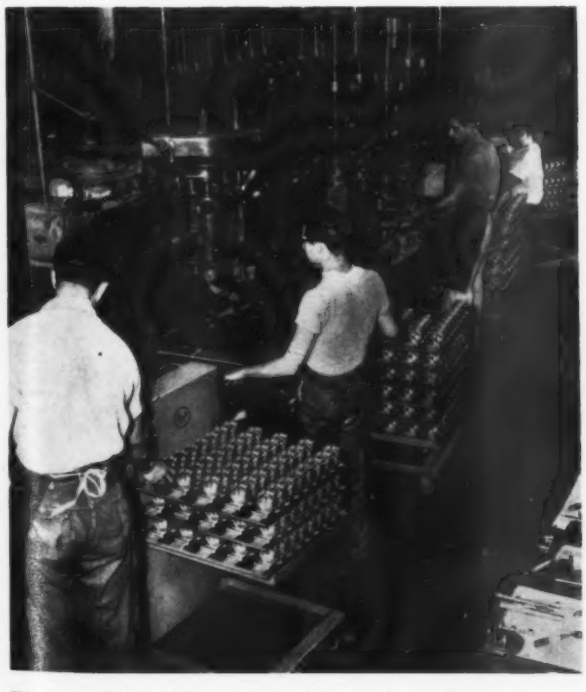

*DEMAND RATED WATER HEATERS by Rheem have been announced. Andrew F. Cassidy, Home Products division of Rheem Mfg. Co., Chicago, reviews final plans for point-of-sale identification label of the new Rheemglas water heaters. Robert J. Pierson shows how the Demand Rated seal will be affixed to the Rheemglas "Holiday," while D. W. Proulx indicates position of the seal on new Rheemglas "Fury."*

*THIRTY-NINTH FLOOR INSTALLATION of heavy-duty air conditioning equipment is illustrated in photograph of the Seagram building in New York. This is the first of four Carrier Corporation refrigerating machines to be hoisted to the 39th floor where they will provide cooling equal to the melting of 3,250 tons of ice daily.*

# . . . foto-news

**A thousand words this MPM foto-news features. Few words about people and products.**

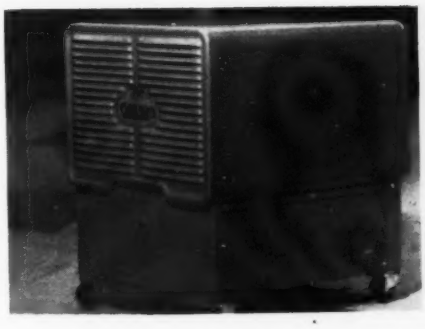
*OASIS WATER COOLER fits anyplace where the family can enjoy it, including the patio. It plugs into any AC outlet, with no plumbing or drains. The Oasis "Bottelet" can be fitted on two accessory rubber wheels for easy portability. Painted in Desert Dawn or white, it's engineered for noiseless operation and is manufactured by the Ebco Mfg. Co., Columbus, Ohio.*



*THE BURROUGHS COMPANY achieves balanced production with the help of AMF Self-Leveling Work Positioners despite variances in machining times. As material is placed upon platform of the Work Positioner, calibrated spring mechanism permits it to descend in direct ratio to weight of the material.*

*MODULAR STEEL DESKS help to gain greater per-square-foot efficiency out of existing quarters. These units, available in a wide range of sizes, types, and shapes, can be used individually or in combination with existing office equipment, according to the manufacturers, Cole Steel Equipment Co. The desks are designed with interchangeable tops, panels and pedestals, so that they can be regrouped to meet changing office needs.*

*CONVERTING DAMP, MUSTY basements into areas of living may be accomplished with an Oasis dehumidifier. Excess moisture is eliminated by removing up to three gallons of water from the air in 24 hours.*



*CENTRAL VACUUM CLEANING system for homes has been developed by Sequoia Vacuum Systems, subsidiary of the Sequoia Mfg. Co., western manufacturer of gas furnaces. Called the Sequoia Bilt-in Vac, it adds a new appliance to the built-in appliances now in use. In central vacuum cleaning, the housewife slides a 21-foot vinyl plastic hose into a wall or floor inlet.*

# Purchasing Agent . . . 1957

The lady of the house is the Purchasing Agent, not only for her home and family, but in reality for you. It's her whims in design and quality that dictates to you and your company what you make and how you make it.

Quality and price are the two things she shops for most. Combine the two in one product and you've got a sale.

This is the reason for Peerless' large volume of formed wire products in the home appliance field. The leading manufacturers know Peerless as a source of quality and price in wire goods.

We would like to serve you. Your drawings by mail will be returned with our quotation and recommendations. Or a call will bring a factory expert to your plant. We'll be pleased to hear from you.

**Peerless** FORMED WIRE PRODUCTS

PEERLESS WIRE GOODS COMPANY, INC.

2702 FERRY STREET • LAFAYETTE, INDIANA

*"Peerless Products Please"*

ESTABLISHED 1910

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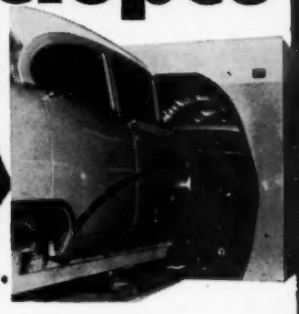
leading auto manufacturers install **clepco** QUARTZ OVENS



*Here's Why...*

CLEPCO Quartz Paint Ovens are based on the use of special CLEPCO Quartz Heaters designed to emit that part of the heat spectrum most readily absorbed by paints.

Another major auto manufacturer reports that CLEPCO Paint Ovens are lower in original cost as well as in operating costs than the conventional gas fired convection ovens previously in use.

CLEPCO'S Complete Research Facilities are at your service to determine the most efficient quartz oven for your requirements.

SEND FOR COMPLETE INFORMATION

**THE CLEVELAND PROCESS COMPANY**

1965 EAST 57TH STREET • CLEVELAND 3, OHIO

CLEPCO

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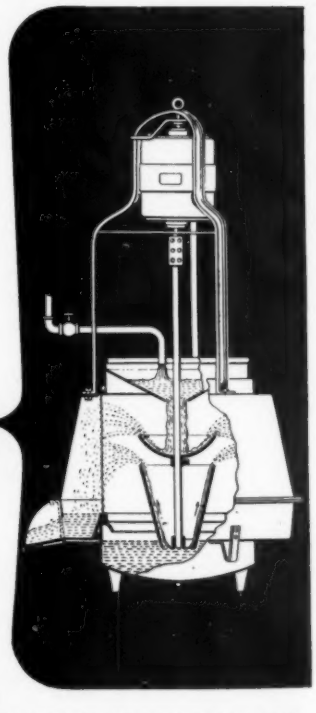
## ROTOSPRAYING . . . *A Standard at Kohler!*



● Kohler of Kohler has been using Rotospraying as a method of sieving vitreous glaze for years. They have recently ordered Rotosprays for their new Spartanburg, South Carolina pottery—proof of their confidence in Rotospray equipment.

ROTOSPRAY

● Check your plant today and make sure that you have the correct number and size of Rotospray units for efficient operation.

**ROTOSPRAY MANUFACTURING CO.**

562 W. WASHINGTON BLVD. • CHICAGO 6, ILLINOIS

*Newly-elected officers of* NEMA's MAJOR APPLIANCE DIVISION *are: (left) C. K. Rieger, General Electric, Division chairman; and (right) John A. Hurley, Whirlpool, vice chairman.*

# NEMA appliance division formulates plans for 1958

## GE's Charles Rieger is new division chairman—plans include continued high level of sales promotion

NEW officers were elected and plans for 1958 sales promotional programs discussed by the Major Appliance Division of the National Electrical Manufacturers Association during the Division's annual 3-day convention held at Hot Springs, Virginia, June 27 through 29. New officers also were named by product Sections of the Division at meetings held in connection with the convention.

Charles K. Rieger, a vice president of the General Electric Company and general manager of its Appliance and Television Receiver Division at Louisville, Ky., was named chairman of the Division for the ensuing year. He succeeds R. J. Sargent, Pittsburgh, Pa., manager, Marketing and Distribution, Consumer Products Division, Westinghouse Electric Corporation.

John A. Hurley, St. Joseph, Mich., vice president in charge of RCA-Whirlpool Corporation, was elected vice chairman of the Division.

### Manufacturers and utilities to distribute teaching kits

C. J. Prashaw, Chairman of the Division's Program Coordinating Committee, and supervisor, Electric Power Sales, Frigidaire Division, General Motors Corporation, presented a review of next year's promotional activities.

Highlighting programs to be conducted by electric range and household refrigerator and freezer sections will be a coordinated activity between the manufacturers and the utility companies to distribute teaching kits about electric ranges and freezers to all home economics instructors. This activity also will be stressed in advertisements to be placed in publications reaching these instructors and school management officials.

### Range and water heater programs

The Electric Range Section plans to work closely with home builders by supplying them with direct mail material to pass out to prospective home buyers and to their sales personnel. Such material will stress the reasons why "the electric range is the key factor in establishing a home for modern living." In addition, builders will be supplied with display cards for use on electric ranges installed in model homes to call attention to the advantages of cooking electrically.

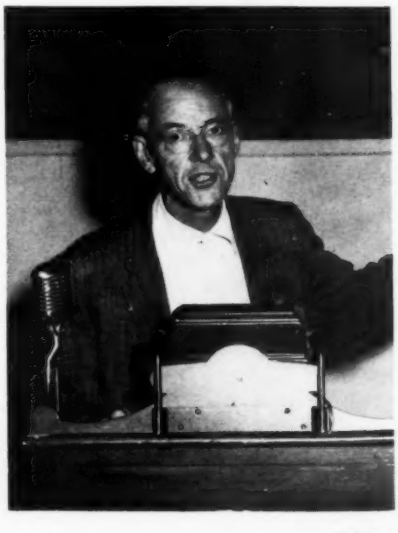
The electric water heater section has decided to push the story of the quick recovery water heater for the first time next year. This will be done in campaigns directed toward plumbing contractors and consumers in the farm and rural market.

The quick recovery water heater is beginning to make a decided impression on the new home and modernization market, industry spokesmen report.

### To step up merchandising of automatic dishwashers

Member companies in the household sink section voted to intensify their program to still further increase the sale of automatic electric dishwashers. It was

*Left: George Kobick, General Electric, discusses the package mortgage and its effect upon major appliance sales at the* NEMA *meeting.*



*Right: Harold T. Hulett, General Electric, reports on progress in the development of modular coordination of major electric appliances compatible with the construction industry's modular coordination program.*

*Two of three newly-elected officers of* NEMA's HOUSEHOLD REFRIGERATOR AND FREEZER SECTION *are: (left) Frank Hausfeld, Whirlpool, chairman of the General Engineering committee: and (right) E. B. Barnes, American Motors. Not shown is E. T. Morton, Whirlpool.*

*E. P. Van Sciver, Philco, was elected chairman of* NEMA's ELECTRIC RANGE SECTION.

*F. A. Lowery, Westinghouse Electric, and H. T. Hulett, General Electric, were elected chairman and vice chairman, respectively, of* NEMA's HOUSEHOLD SINK UNITS SECTION.

pointed out that sales of this appliance have almost doubled each year since 1954, with 1956 sales hitting an all-time peak of $100,000,000.

The 1958 program will be aimed at achieving greater consumer acceptance and provide more information about the advantages of using this appliance to lighten household chores. The section also decided to step up the merchandising phases of the program and extend them to reach the home buliders and plumbers. Much of the material to be released to both consumer and trade avenues will include such factual data as the Ohio Study — an investigative project conducted at Ohio State University to prove the value of automatic electric dishwashers from time-saving and health standpoints.

Under consideration, also, are a new newspaper supplement, window streamer, new consumer brochure and a personal contact among utility companies and newspapers.

**Built-ins credited with cooking gain**

On the business side, the nation's appliance manufacturers heard H. E. Weimer, St. Joseph, Mich., general manager of market research, Whirlpool Corporation, say that the "current trend is toward electric cooking." He stated that electric cooking has increased by 10% over the past five years with "much of this gain accounted for by the swing toward electric built-in ranges."

There are several reasons for the increase in the installation of built-in equipment, Mr. Weimer said, in citing the following as major contributions: "consumer appeal, and the approval given by the Veterans Administration and the Federal Housing Administration for including this type of equipment as a part of new home construction."

He warned, however, that the spurt toward built-in ranges also poses a problem in that most of this equipment now is sold through builders and, therefore, its sale is tied almost entirely to new housing starts. When construction slows down, so does the sale of built-ins.

*Enjoying a break during the* NEMA HOUSEHOLD REFRIGERATOR AND FREEZER SECTION *meeting are, seated, (left to right) W. J. Jeffrey, Kelvinator; John Otter, Philco; H. W. Shaefer, Philco; Don Benson,* NEMA; *H. C. Smith,* NEMA; *A. W. Kurz, Philco, Section chairman; W. M. Timmerman, General Electric; B. A. Chapman, American Motors; H. L. Travis, Kelvinator; W. E. Saylor, Kelvinator; E. B. Barnes, Kelvinator; W. R. Arbuckle, Westinghouse; C. K. Rieger, General Electric; J. Rushton, Frigidaire; and H. S. Lenz, Ralph H. Jones Co. Standing, (left to right) A. J. Rosebraugh, Philco; F. J. Hausfeld, Whirlpool; R. W. Shaul,* NEMA; *and H. E. Weimer, Whirlpool.*

*Enjoying a round of golf at the* NEMA *meeting are: C. K. Rieger, vice president and general manager, Appliance and Television Receiver Division, General Electric; John Otter, executive vice president, Marketing, Philco; Joseph F. Miller, managing director,* NEMA; *and R. J. Sargent, general manager, Marketing and Distribution, Consumer Products Division, Westinghouse Electric Corp.*

## NEMA APPLIANCE DIVISION

The problem, therefore, is to encourage the installation of more built-in units in existing homes as a part of kitchen modernization plans. This, he said, might be more easily accomplished now than ever before because many people are remodeling their present homes in view of the tight money market and the rising costs of new construction.

Builders, he said, are seeking other opportunities for home sales features which will work just as effectively as built-in electric ranges and, he posed the question: "If it works for ranges, why won't it work for other major appliances?

Section officers for NEMA appliance division are:

### Electric Range Section

**Chairman — E. P. Van Sciver, Philadelphia, Pa., product manager, Electric Ranges, Disposers and Dishwashers, Philco Corp.**

**Vice Chairman — R. P. Brook, Mansfield, O., manager, Range Department, Electric Appliance Division, Westinghouse Electric Corp.**

**Chairman of General Engineering Committee — W. R. McDowell, Chicago, Illinois, manager, Range and Component Parts Engineering, Hotpoint Company.**

### Household Sink Units Section

**Chairman — H. T. Hulett, Louisville, Ky., general manager, Dishwasher and Disposall Department, General Electric Company**

**Vice Chairman — F. A. Lowery, Columbus, O., manager, Water Heater and Kitchen Utilities Department, Westinghouse Electric Corp.**

**Chairman of Technical Committee — A. R. Kays, Connersville, Ind., manager, Electromechanical Research and Development, American Kitchens Division, Avco Manufacturing Corp.**

### Household Refrigerator and Freezer Section

**Chairman — E. T. Morton, St. Joseph, Mich., merchandising manager, Refrigerators, Freezers and Ice Cube Makers, Whirlpool Corp.**

**Vice Chairman — E. B. Barnes, Detroit, Mich., general sales manager, Kelvinator Division, American Motors Corporation.**

**Chairman of General Engineering Committee — Frank Hausfeld, Evansville, Ind., chief engineer, RCA-Whirlpool Refrigerators and Freezers, Evansville Division, Whirlpool Corporation.**

### Water Heater Section

**Chairman — E. M. Haines, Chicago, Illinois, general manager, Dishwasher, Water Heater and Custom Appliances Department, Hotpoint Co.**

**Vice Chairman — D. W. Proulx, Chicago, Illinois, National Product Manager of Water Heaters, Rheem Manufacturing Co.**

**Chairman of Technical Committee — J. H. Reifenberg, Columbus, Ohio, Manager, Dishwasher-Water Heater Engineering Department, Westinghouse Electric Corporation**

## Editor's Mail

→ *from Page 12*

### Interested in statistics

Gentlemen: We are wondering whether the annual MPM Market and Statistical Review is included in our subscription of METAL PRODUCTS MANUFACTURING, or is this an extra publication. We are interested in receiving a copy of this Fourth Annual Market and Statistical Review and also a copy of the April, 1957 issue of METAL PRODUCTS MANUFACTURING.

**Lisle Hodell**
**General Manager**
**General Purpose Component Motor Department**
**General Electric Co.**
**2000 Taylor St.**
**Fort Wayne 9, Ind.**

Ed. Note: We are pleased to learn of your interest in the MPM Fourth Annual Market and Statistical Review. There is no charge for this, and you'll find a copy enclosed with this letter.

We're also sending you a copy of the April 1957 issue of MPM as requested.

### Finds features interesting

Gentlemen: I continue to be amazed at the interest you pack into MPM for guys who are as far removed from the metal products manufacturing industry as I happen to be.

Your June issue, for example, contained some very handsome editorial art. I cannot imagine any male too busy (or too old) to drink in the collective beauty to be found on pages 79 and 80.

It is difficult to envision a man in the electric appliance or utility field who would not glean a few pearls from Mr. Forsyth's article on electric space heating (page 37, June issue).

**Charles E. Gressle**
**Ayer and Gillett Advertising**
**Charlotte, N. C.**

### article timely for sales meeting

Gentlemen: Thank you very much for the June issue of METAL PRODUCTS MANUFACTURING with the story on the Mary Proctor "Mrs. America" Steam and Dry Iron.

We were very much impressed by your treatment of this revolutionary new appliance, and it arrived just in time to be featured at a National Sales Meeting attended by our entire sales force. It was read by all of our men and they were highly complimentary of the way the story was presented.

Since they all saw and read the story, I believe reprints would be an anti-climax. However, we do want you to know that we sincerely appreciate your interest in Proctor and our products.

**George Burke**
**Public Relations Manager**
**Proctor Electric Co.**
**Philadelphia, Pa.**

in the new NORGE

*more beauty* – *plus convenience and usable space*

*more efficiency* – *with REYNOLDS ALUMINUM TUBED SHEET One-Side-Flat EVAPORATORS*✶ (patent pending)


Norge Model S-107

✶ fabricated and finished by

**REYNOLDS ALUMINUM FABRICATING SERVICE**

# How NORGE uses Tubed Sheet One-Side-Flat to Gain Flexibility, Economy and Selling Features

The handsome 10′ and 13′ Norge super-deluxe refrigerators are value packed . . . and one of their exciting features is evaporators made of Reynolds Aluminum Tubed Sheet *One-Side-Flat*. Here are some of the reasons why Norge selected evaporators made of this revolutionary material that is flat on one side and has the *built-in* heat transfer passageways on the other side.

**Better Performance—More Consumer Selling Features With Tubed Sheet One-Side-Flat Evaporators**

- Flat surfaces make it easier to defrost, improve drainage of water and other liquids, permit faster and easier and more thorough cleaning.
- Flat surfaces permit small jars, bottles, cans and other containers to rest on smooth surface without wobbling or tipping, thus reducing possibility of spillage.
- Flat surfaces aid in faster freezing by permitting direct contact with food packages, ice cube trays and other items to cooling passages in top, bottom and sides of freezer chest. Excellent heat transfer by conduction is assured and insulating air spaces are eliminated.
- Flat surfaces mean no high points to concentrate wear on critical tube surfaces.

**New Flexibility In Design**

- Reynolds Tubed Sheet *One-Side-Flat* is the only sheet with one flat side providing integral tubing in any parallel or *non-parallel* patterns no matter how complex. Almost any tubing pattern that can be drawn can be quickly and economically produced in Tubed Sheet with practically unlimited circuiting possibilities. Passageways can be flat or oval; large or small; spaced close together or apart. Redesigns are simplified, can be made quicker.

**Greater Economy**

- Metal formerly used for evaporator tubing, accumulators and receivers is eliminated. Many connecting and assembly operations are eliminated. Additional tubing lengths add nothing to cost. Redesigning costs are much less.

**More Attractive Product**

- Can be embossed in a decorative pattern or left smooth. Can be color anodized in any color desired to match color-styled refrigerator and freezer interiors.

*For details on Tubed Sheet One-Side-Flat, contact your nearest Reynolds Offices or write to address below.*

Tubed Sheet One-Side-Flat refrigerator evaporator. Note pattern on one side, other side smooth.

*"We believe our choice of Reynolds Aluminum Tubed Sheet One-Side-Flat evaporators gives us the maximum in circuit design flexibility and gives buyers of Norge Refrigerators the fastest freezing evaporators possible."*

Mr. Harley Whitmore
Director of Engineering on Norge Refrigerators
Muskegon Heights, Michigan

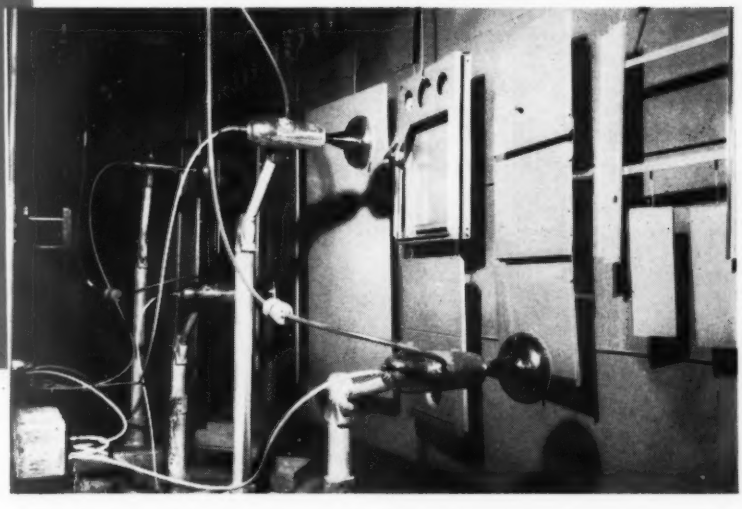
## REYNOLDS ALUMINUM FABRICATING SERVICE

**2008 South Ninth Street, Louisville 1, Kentucky**

BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING
WELDING • ROLL SHAPING • TUBE BENDING • BRAZING • FINISHING

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

# 3 times as many Furnace Casings per gallon of paint with RANSBURG NO. 2 PROCESS!



This Lo Boy model, Series 6000, is typical of the Waterman-Waterbury line of winter air conditioners now painted electrostatically.

## Quality of work is improved; Labor costs are cut and Production Stepped up 150% with

RANSBURG Electrostatic Spray Painting

Results exceeded expectations when Waterman-Waterbury, Minneapolis, modernized their finishing department and went from hand spray to Ransburg No. 2 Process in painting their quality line of heating and air conditioning equipment.

By the former hand spray method, W-W used a half gallon of paint to coat a single casing. Now, with Ransburg No. 2, they get SIX CASINGS PER GALLON . . . or 3 times as many per gallon. Furnace casings, as well as other painted parts which go into the famous Waterbury Furnaces, now get a uniform coating of .8-mil.

Production was increased, too, as automatic painting enabled them to step up the conveyor speed from 7 fpm to 11½ fpm. Where they formerly turned out a complete furnace in five minutes, NOW they assemble three in just six minutes . . . an increase of 150%. All in all, they figure the modernization program—with Electro-Coating—saved over $11,000 in the first three months of operation.

**NO REASON WHY YOU CAN'T DO IT TOO!**

Whatever you paint, we'd like to tell you more about the efficiencies and worthwhile savings which can be yours with Ransburg Electro-Coating Processes. Get our No. 2 Process brochure which cites many on-the-job examples of electrostatic spray painting on a wide variety of products. Or, we'll be happy to loan you our new film, "The Big Attraction" which tells the electrostatic spray painting story in sound and full color. Call or write

**RANSBURG**
**Electro-Coating Corp.**
Barth and Sanders, Indianapolis 7, Indiana


*Directors of* NHMA *from left, B. C. Neece, president, Landers, Frary and Clark; C. D. Bridell, president, Chas. D. Bridell, Inc.; J. M. Bredfeld, Corning Glass Works; G. C. Kubitz, vice president, Aluminum Goods Mfg. Co. and treasurer of* NHMA*; W. H. Sahloff, vice president, G. E. and vice president of* NHMA.

*C. O. Hamilton, executive vice president Hamilton Mfg. Corp., president of* NHMA.

# Housewares show biggest ever

## 61% of manufacturers expect 1957 dollar volume to exceed 1956 by 19%

THE BIGGEST summer show in housewares history was held at Atlantic City July 8-12 and was acclaimed by many to be a solid indication of the future good business of the portable appliance field. 615 manufacturers from 32 states represented the greatest number of exhibitors that have ever been accommodated at a summer show. More floor space than was ever used before, 11,000 sq. ft. more than last year, made the 27th exhibit of the National Housewares Manufacturers Association in Convention Hall an impressive one.

Clarence O. Hamilton, Hamilton Manufacturing Corp., Columbus, Ind., NHMA president, reported that a survey among manufacturers and buyers indicated that the second half of 1957 would be even better than the first six months. According to the survey conducted by Dolph Zapfel, secretary of NHMA, the majority of the buyers surveyed reported that they expect their company's gross dollar volume in housewares for 1957 to exceed that of 1956. 59% said they expect the improvement to be 17%. An even greater percentage, namely 61%, of the manufacturers surveyed expect the 1957 dollar volume to exceed that of 1956 by an average of 19%. Manufacturers and buyers both agreed at a percentage of 69 and 73 respectively, that the second half of 1957 will produce better housewares business than the first half.

*H. R. Davis, national retail sales manager, Sears Roebuck and Co.*

Along with the optimistic statistics H. R. Davis, national retail sales manager for Sears, Roebuck and Co., said that despite the recent increase in steel prices most retailers will probably hold the line on home appliances and other household goods. "There will be some price increases from the manufacturers but the retailer will probably hold present prices as far as possible," he said.

A good indication of the large attendance at the housewares show was the number of registrations for the first day. Before the day was over registrations totaled 11,024, including buyers, manufacturers and other industry representatives. This number exceeded by more than 1,000 the registrations for the full eight hours on opening day last


*H. J. McCormick, general sales manager, Revere Copper and Brass, Inc.; Harry Schwartz, v. p. Lincoln Metal Products Co.; J. M. Jayne, Executive vice president, The Plas-Tex Corp.; L. C. Nelson, president The Cal-Dak Co.*

year. Furthermore, buyer registration showed a great improvement of 4,430 compared with 3,507 at last years opening day.

### Color popularity continues

Appearance-wise the rainbow of colors prevalent on the products at the show proved that more than ever before color is becoming accepted and increased in each succeeding year. Color and modern design have changed the American home, and the housewares industry has been a major factor in that change.

The number of new products that were introduced at the show were greater than for any previous year. Added to this was the freshness of design and the increased utilitarian value of the portable appliance group. For instance, Dominion Electric has brought out an automatic griddle that has a plug-in thermostat thereby eliminating the danger of ruining this vital electric unit when it comes time to wash the pan. The Toastmaster Div. of McGraw-Edison Company has introduced an automatic coffee maker and two new room heaters. Dual heating elements in the coffee maker are supposed to heat the water more rapidly than is ordinary. The new space heaters are designed to circulate warm air immediately after the switch is turned on. The instant it is turned on heat delivery is possible because of a specially developed element using an open coil of ribbon resistance wire, which becomes red hot as soon as the current is turned on.

### Portable automatic dishwasher

One of the most unique appliances introduced at the show was a new design in a portable automatic dishwasher. The Chico General Products Corp. has announced that the dishwasher will be on the market in western states by September. The San Francisco manufacturer said that the appliance will be retailed at $59.95, just a fraction of the cost of a full sized dishwasher. The dishwasher uses liquid detergent rather than the granulated type and it is automatically fed into the washing cycle from a patented detergent cup built into the water intake system. The dishwasher is said to be capable of washing and rinsing up to 36 plates, cups, saucers, glasses, and platters and 25 to 30 pieces of silverware. No pre-rinsing is required and the dishes are air-dried in minutes after a maximum wash and rinse cycle of 5 to 8 minutes.

### Spray, steam and dry iron

General Electric has developed a hand iron that combines the steam and usual dry features with a spray action. This spray feature lets the operator sprinkle clothes as she irons. It is said to erase stubborn wrinkles in a very short space of time. In addition to the iron GE has developed automatic sauce pans that have completely removeable thermostatic heating controls.

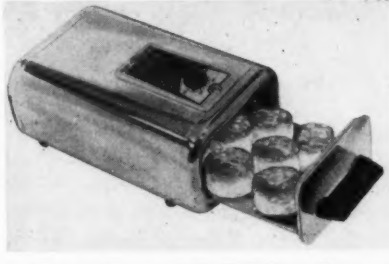
A new vacuum cleaner* that "caddies" its accessory tools and has large wheels for fast and easier mobility was introduced by Westinghouse Electric Corporation. Attachments that come with the cleaner are carried in a built-in caddy. The hose is of light-weight and flexible vinyl plastic.

After not having been in the room heater business for about twenty years Westinghouse has come out with four new models. Some of the models include fan-forced air as well as radiant heat from the steam-resistant aluminum reflectors, thermostatic control, an automatic "tip over" switch, two heat levels, and a five year guarantee.

*See Spotlight Page, this issue.

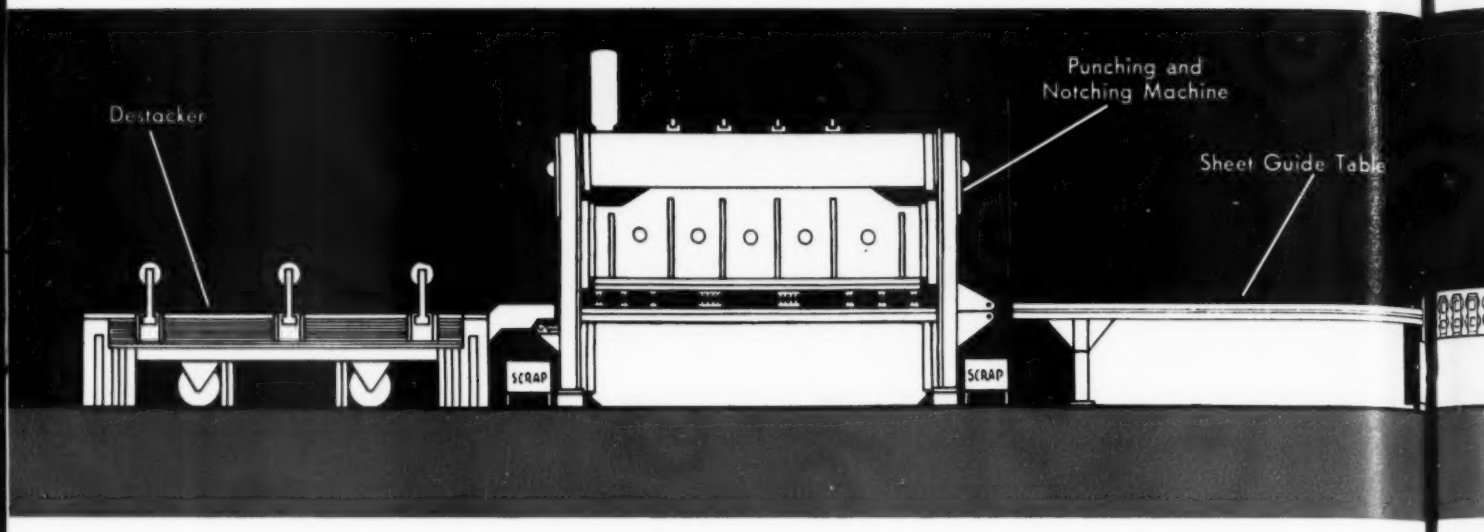
## AMONG THE NEW PRODUCTS

*New Toastmaster coffee maker features high speed operation.*



*Knapp-Monarch Redi-Baker allows baking at the table.*


*Clean, fresh design feature of new Dominion Electric toaster.*




# Equipment for producing the "square" look

**describing and picturing the units of a mechanized fabricating line for the production of "tight corner" or "square look" appliance cabinets**

*by Edward P. Schneider* • MANAGER, MACHINERY DIVISION, STRUTHERS WELLS CORP.

AS the new appliances for 1957 were unveiled at markets, pre-market showings, and sales and press meetings, it soon became evident that a major change had been made on many of the cabinet-type appliances. In the forefront of this new or different design was the refrigerator.

For years the engineer, the production executive, and the sales manager had believed, or had been led to believe that for reasons of practical production and for reasons of modern aesthetic design, the wide radius or "rounded look" was the thing. The earlier cabinets that were manufactured from flat or flanged sheets and assembled had long since made way for the "soft" designs with wide radius bends and corners.

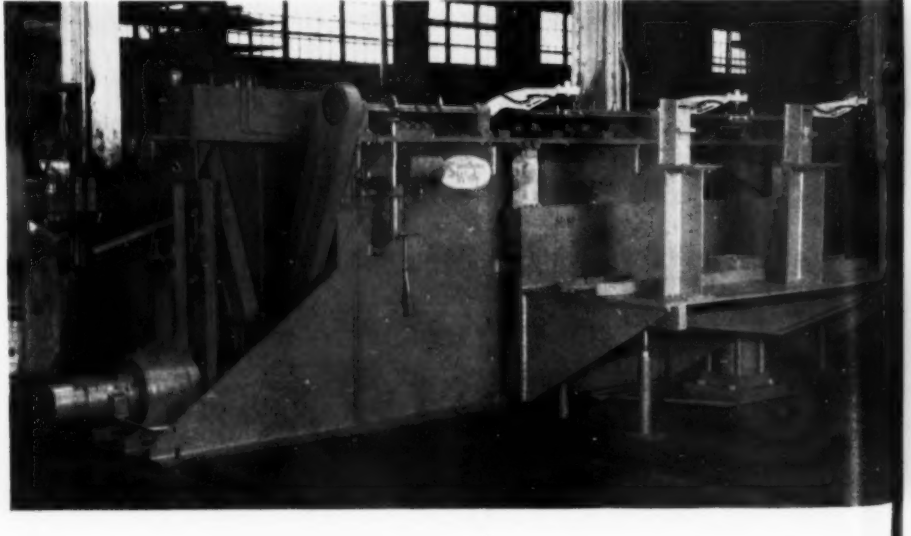
One of the machines that did much to mechanize the production of the one-piece or "wrap-around" cabinet was the bending machine or tangent bender, followed in the production line by the automatic or semi-automatic welder. As might be expected in many of today's high production plants, the two machines were soon combined into a single operating unit.

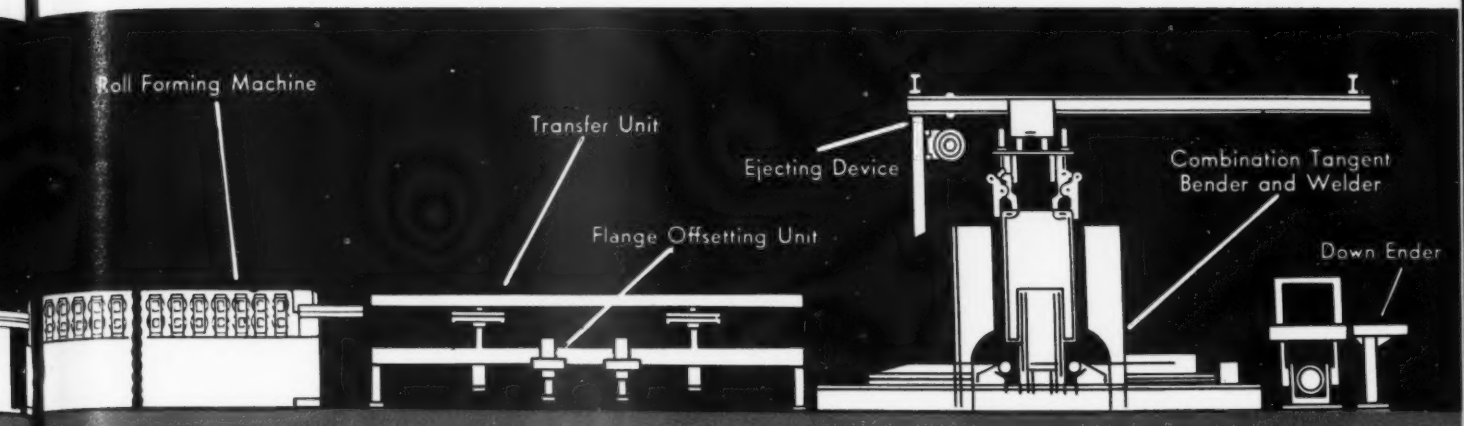
## An automatic line for refrigerator cabinets

The purpose of this article is to picture and describe a typical straight line production setup for the fabrication of a "square type" or sharp radius cabinet. The line illustrated is a completely automated setup for the production of wrap-around refrigerator cabinets.

The first equipment in the automated line is the destacker, which is loaded with sheet steel according to specification for the unit to be produced. Ap-

*Destacker from which sheared sheets are fed to the punching and notching machine.*



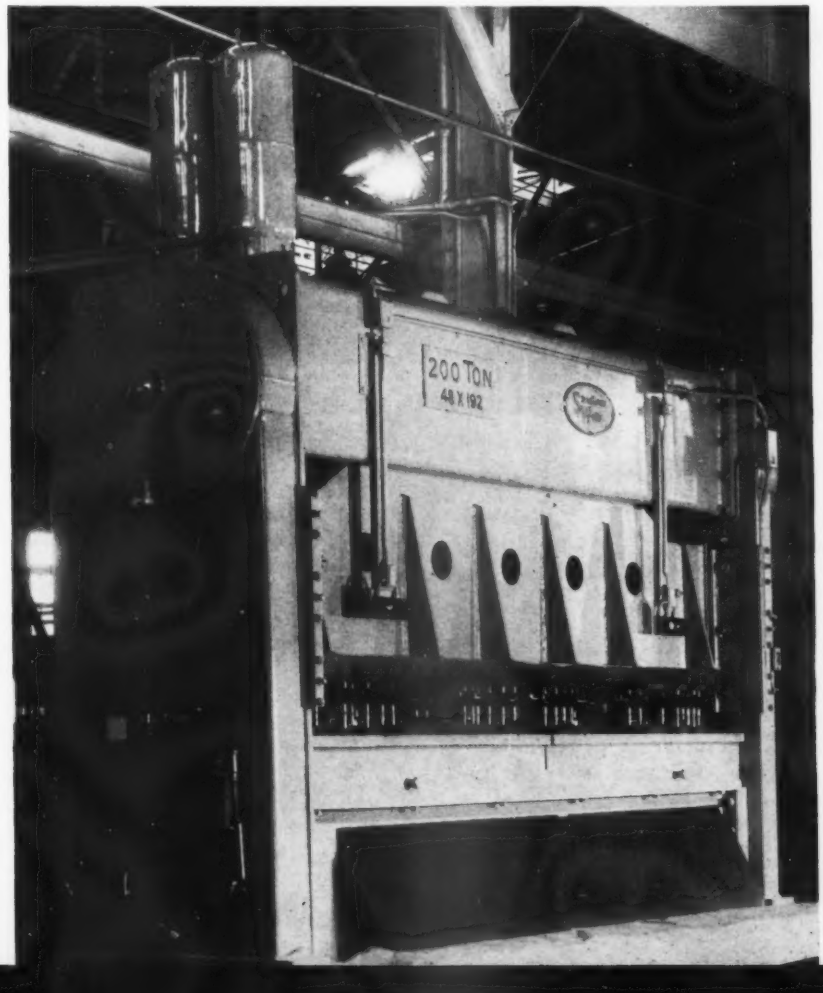


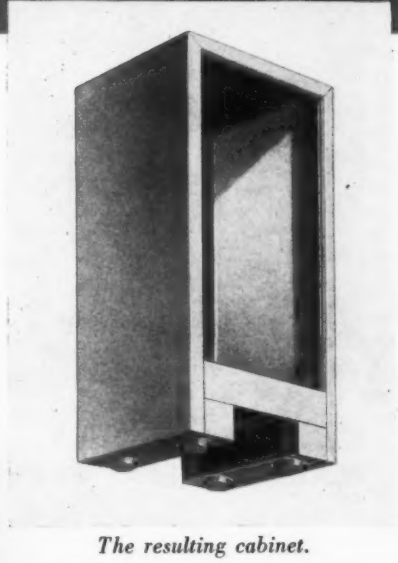

proximately 400 sheets of required grade, gauge and size are loaded on the destacker and, from this point on, the continuing operations are automatic.

The next unit in the fabricating line is the punching and notching machine. It features several advantages over other types of similar equipment. For instance, it has a box-type frame, as opposed to conventional plate construction. This is said to result in extremely-low deflection — less than half the amount encountered ordinarily. The clutch and brake are pneumatically operated and, being in a combination unit, eliminates overlap. An important safety feature of clutch operation provides for the application of the brake if the power should fail.

Capacity of the machine used in a cabinet fabricating line is 200 tons at one-quarter inch before completion of the power stroke. The length of the bolster plate and ram is 16 feet by three and three-quarter inches, and the width is 48 inches. The stroke and ram adjustment both are five inches. A speed of thirty strokes per minute is possible with this punching and notching machine.

*Punching and notching in this instance is done on a 200-ton machine. Punch and die sets for a typical job can be seen clearly in the photo. Note the resulting fabricated sheet at the bottom of the picture.*



*The resulting cabinet.*

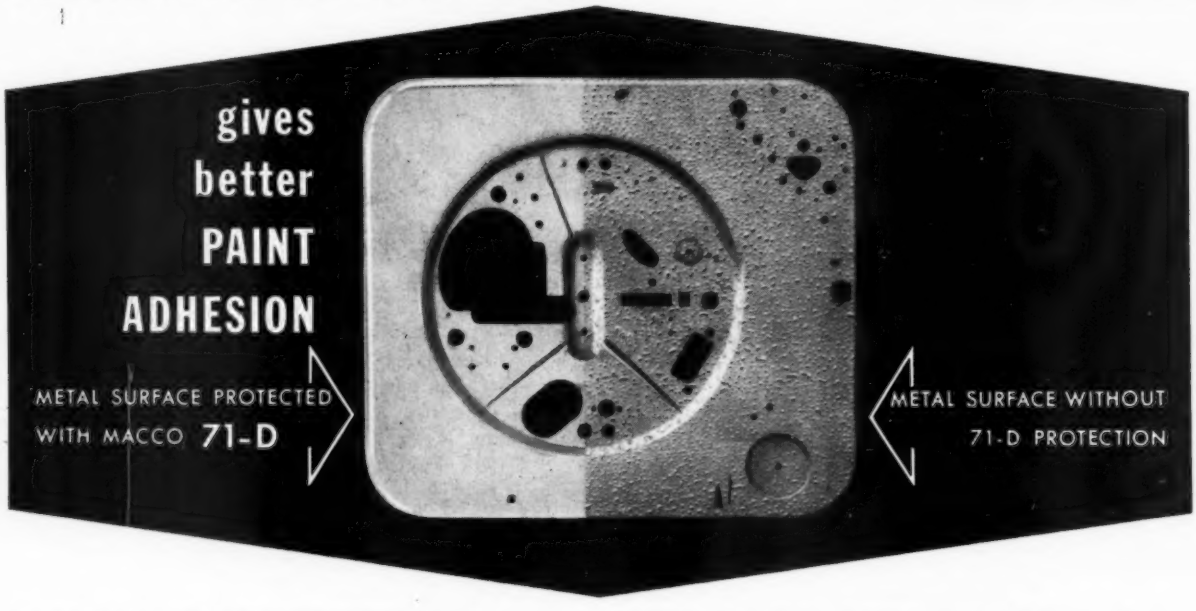
This machine is equipped with an automated feeding mechanism to process the cabinet left to right through the end openings, and has a scrap conveyor to take care of punchings and trimmed scrap material.

From the punching and notching machine, the sheets feed to the sheet guide table which, in turn, serves the roll forming machine. The roll forming machine processes the front and back flanges of the notched and pierced sheet in a continuous operation.

When the cabinet is received from the roll forming machine, the flanges are

# MACCO MACHINE CLEANER 71-D prevents RUST SPREAD & BLISTERS

**a phosphate cleaner and rust inhibitor**

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offset at the mitre joint so that they will overlap in the bending operation for seam welding. While this work is being performed, hinge bars or hinge pierce holes are generally fabricated.

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After welding operation of front mitre corners, burr shear inserts move down removing excess welded metal and the entire insert irons the wide flange on the return stroke of the forming wing. Welding back mechanism and bending die contracts and moves out of the front of the formed cabinet on a shaper slide mechanism. The cabinet is then picked up by an ejecting device.

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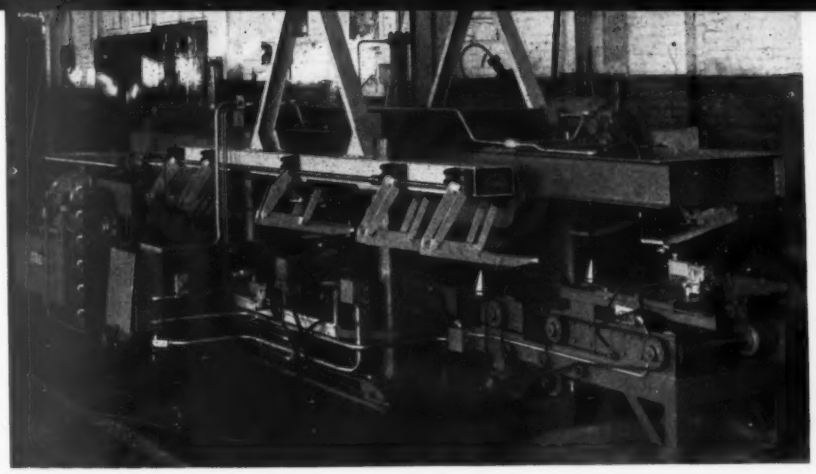
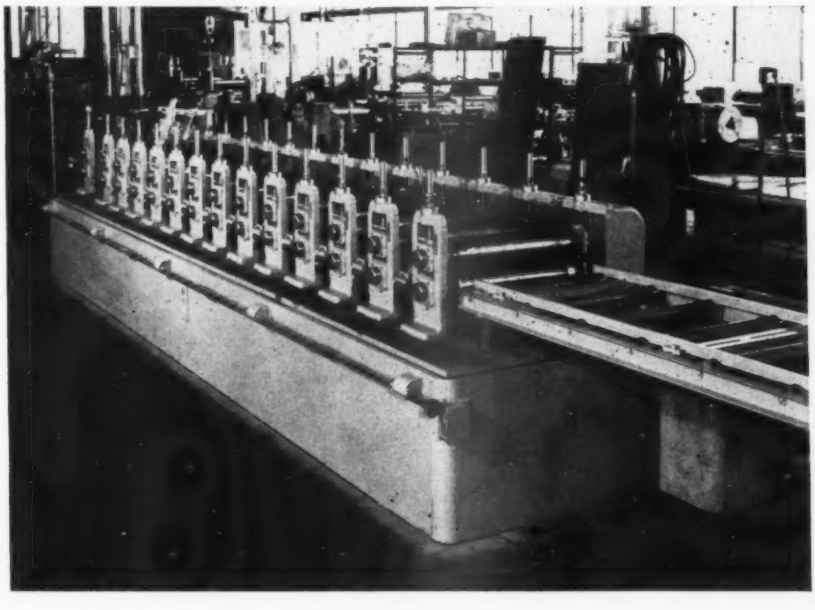


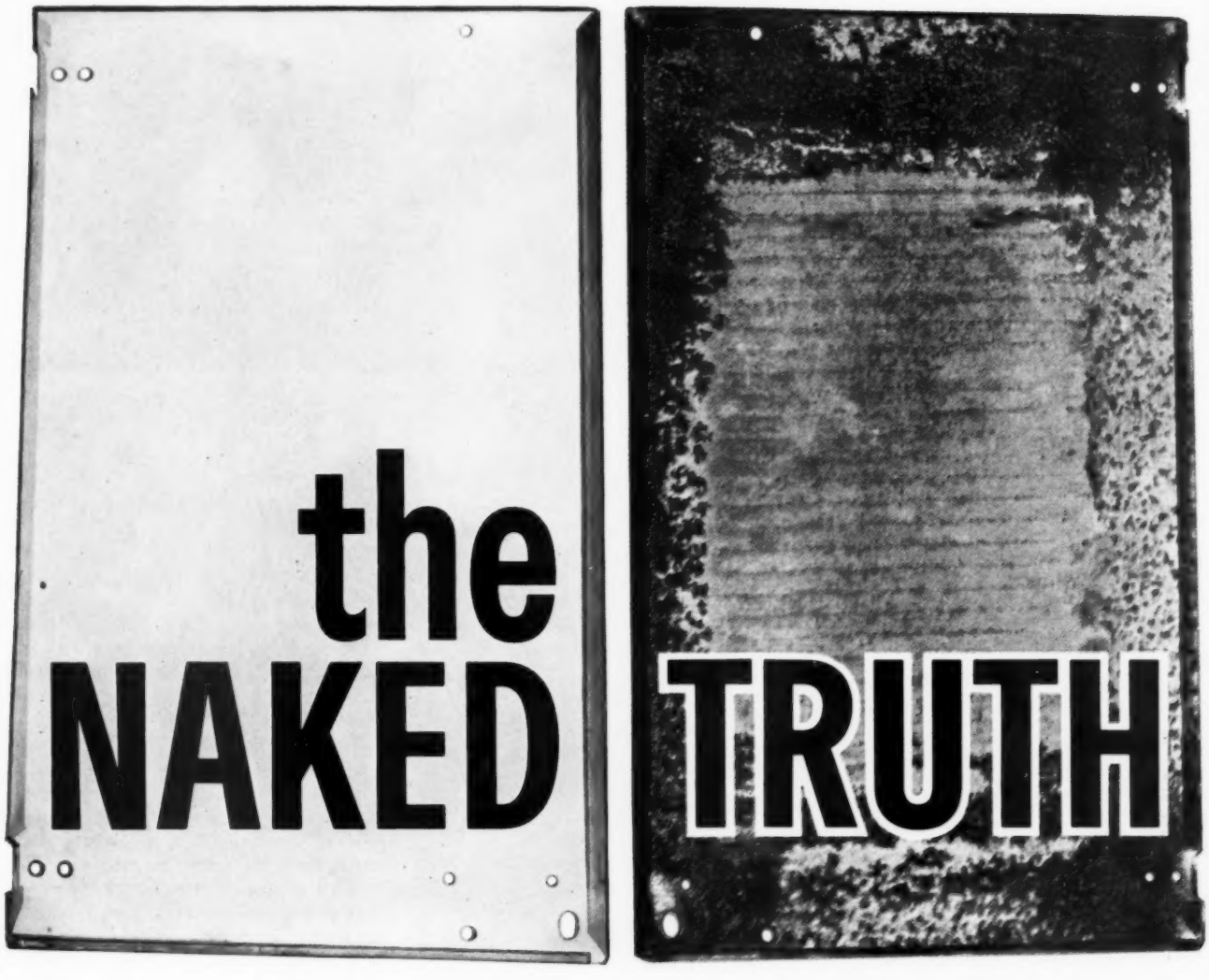
*The transfer unit and flange offset unit which is located between the roll forming machine and the bender-welder is pictured here.*



*Yoder M2½ refrigerator shell roll forming machine. Cabinets are made from cut-to-length sheets which are notched and punched at the ends and along the edges for assembly, then cold roll formed into straight sections before being given the final shape.*

PHOTO COURTESY THE YODER CO.

*The combination bender-welder is the key unit for the completion of the automated fabricating line. It is shown here with the transfer unit and flange offset unit as they appear together in the production line.*

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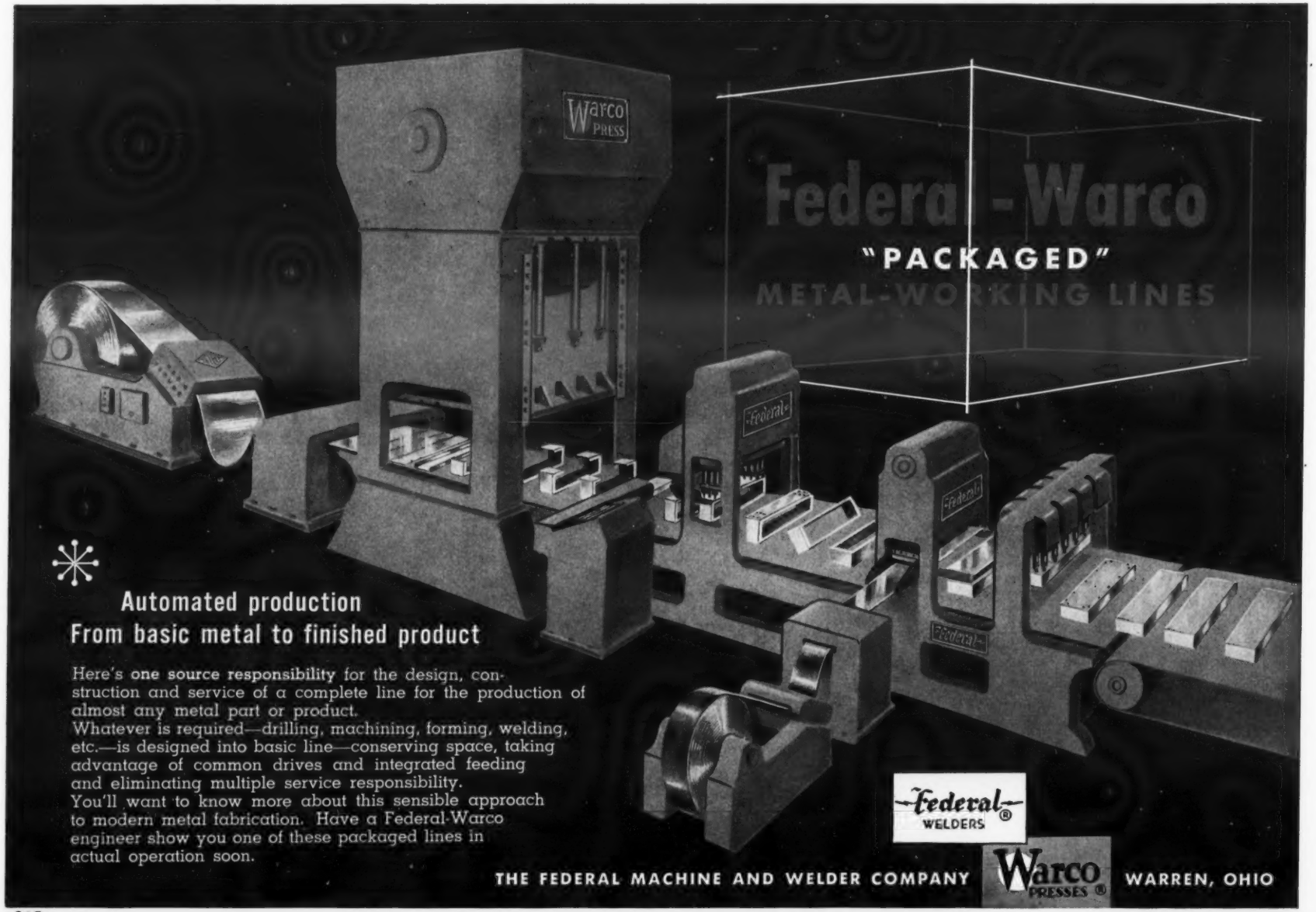
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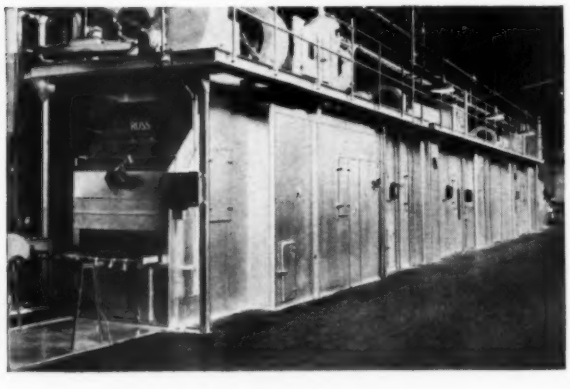

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# A review of surface treatments of metal

**a general non-technical treatment of the subject of surface treatments prior to organic finishing, for ferrous and non-ferrous metals**

*by A. J. Tuckerman* • TECHNICAL SERVICE DIRECTOR, BRADLEY PAINT COMPANY

A FEW years ago, an efficiency-minded production engineer would have fumed at the thought of using a two- or three-stage washer in the preparation of steel for organic finishing. This resistance to better pre-treatment of metal has subsided, but the pressure for even better pre-treatment is still mounting. Today, technical men in the paint industry are pointing out that five, seven, or even more stages of pre-treatment prior to painting will assure the best results in many applications. The more progressive-minded production engineers are going along quietly with this advice, for it has been proved to them that paint performance is only as good as the treatment given to the metal prior to paint application.

Nonetheless, there are still those who resist better pre-treatment. This may be noted from the number of sales requests for a sample of paint wherein it is noted that surface preparation is "none" or just "solvent cleaning". Technical men in the paint industry have come to accept this degree of resistance to better pre-treatment as quite normal, and to realize the only way it can be abated is to keep hammering away until the users are convinced.

This article will cover the surface treatments which are commonly used on steel, magnesium, aluminum, zinc, and copper based alloys and will discuss some test methods which are used to evaluate these treatments. When necessary, reference will be made to the applicable Government Specification listed in Table No. 1.

### Two principal groups of metal surface treatments

Metal surface treatments can be divided into two main groups: (1) Those which leave the metal substantially bare of any coating; (2) and those conversion treatments which produce a definite surface coating. The treatments in Group (1) should be considered as cleaning treatments only and should usually be employed in conjunction with subsequent treatments for best paint performance. The conversion treatments along with the coating they produce definitely increase paint adhesion and tend to inhibit corrosion.

The acid wash primer which has been found suitable for most of the metals cannot be classified with either group so will be considered separately.

Cleaning treatments are used for two purposes: . . . . (1) to remove soil; and (2) to remove oxide and other corrosion products.

For the removal of soil (dirt, oil, etc.) one of the following methods is generally employed:

1. Solvent cleaning (immersion, spray, vapor, or wipe).
2. Alkaline cleaning (immersion, spray, or electrolytic). In the case of aluminum and zinc, inhibited alkaline cleaning should be used.
3. Emulsion cleaning (immersion or spray).
4. Steam cleaning.

For the removal of an oxide, or other surface corrosion products, the following methods are most effective:

1. Mechanical cleaning by abrasion (sand blasting, wire brushing, etc.).
2. Acid cleaning.

Generally, mechanical cleaning should be preceeded by a cleaning process to remove all loose soil such as dirt, oil, etc. In a few cases, none of these cleaning methods are practical. This happens when just a section of an assembled product has to be painted, or when the product is too large for cleaning by the methods listed. In these cases, alcoholic phosphoric acid cleaning, either wipe or brush, has proved effective. It produces a thin phosphate film which can be successfully painted. This is also a convenient method to use for surface preparation during touch-up work.

In a few cases, where only very mildly corrosive conditions will affect the product during its service life, cleaning may suffice as the only surface treatment. But even then, alkaline cleaning should be followed by a rinse since an alkaline surface is usually not beneficial for good paint performance. Similarily, acid pickling should be followed by suitable rinses. Chromic acid and phosphoric acid rinses at a pH of 2 to 5 have been found satisfactory as final rinses for most of the metals. However in most cases, where optimum paint performance is required, conversion treatments should follow cleaning.

### Conversion treatments for ferrous metals

For ferrous metals, either an iron or zinc phosphate coating has proved effective, with the zinc phosphate coating usually preferred except in cases where the metal will have to be formed after

*A. J. Tuckerman, author, examines coated panels after exposure test in salt spray cabinet. Laboratory tests on the panels will follow.*

*Gloss measurement on a painted panel after outdoor exposure. Pre-treatment often affects gloss characteristics of final finish.*

surface treatment (this is because zinc phosphate, being a crystalline coating, is more brittle than the iron phosphate).

For proper application of a zinc phosphate coating, at least 5 stages should be used . . . . (1) Cleaning (alkaline, solvent, emulsion or mechanical); (2) Water rinse; (3) Phosphatizing; (4) Water rinse; and (5) Conditioning rinse (chromic acid or a mixture of chromic acid and phosphoric acids at a pH of 2 to 5). The zinc phosphate treatment can be applied by immersion or spray.

Similarly, the iron phosphate treatment should be applied in 5 stages for optimum results, though 2 or 3 stages are often used. It is the opinion of this author that proper cleaning and phosphatizing cannot be accomplished in a single stage, and that a final conditioning rinse is well worth the effort.

### Aluminum and aluminum alloys

There are a number of chemical conversion coatings which can be used on aluminum and its alloys prior to painting. Among these, the anodic coatings, either sulphuric or chromic, are most popular and provide excellent results. In the anodic treatment, the first important step is proper cleaning. This can be accomplished by vapor degreasing or the use of an inhibited alkaline cleaner. The next step is acid treatment using either phosphoric or nitric acids. The anodic treatment follows, using either the chromic anodic or sulphuric anodic process. The final step is the seal, either a water or chromic acid seal in the case of sulphuric acid anodizing or a water seal in the chromic acid anodizing. For paint application, chromic acid anodizing is usually preferred.

Anodizing, however, is an electrolytic process, and for this reason is not practical for all purposes. Other treatments which have been used successfully prior to painting include:—

1. *Crystalline Phosphate Treatment*—This treatment produces a fine crystalline zinc phosphate coating on the surface. The process may be carried out by immersion or spray. The steps are similar to those used for phosphating ferrous metals.

2. *Amorphous Phosphate Treatment*—This produces a thin, adherent, amorphous coating on the surface, iridescent green to gray-green depending upon the alloy. Either immersion or spray may be used in application. The aluminum should be cleaned free of soil and corrosion products prior to treatment.

3. *Carbonate-Chromate Treatment* — This treatment produces a thin, adherent coating on the surface. It is applied by immersion. After thorough cleaning, the following stages are accomplished:—

(1) Immersion in a hot, dilute solution of sodium carbonate and potassium dichromate.
(2) Water rinse.
(3) Immersion in hot 5% potassium dichromate.
(4) Conditioning rinse.

4. *Amorphous Chromate Treatment*—This treatment produces an adherent amorphous mixed metallic oxide film, iridescent golden to light brown. Application can be by immersion, spray or brush. The aluminum should be thoroughly cleaned prior to treatment.

### Surface treatments for magnesium

As with other metals, but more so, the magnesium surface has to be free of soil and corrosion products prior to further treatment. This cleaning is very important, for it is now known that early paint failures and severe pitting which retarded use of the magnesium alloys was caused by improper cleaning.

For the removal of soil from magnesium, the strong alkaline cleaners used for steel are satisfactory. Acid pickling is used for the removal of oxides and other corrosion products.

For new *sand and permanent mold castings*, a solution of 8% V/V nitric acid and 2% V/V sulphuric acid is used for pickling. For old sand and permanent mold castings, from which previous chemical and anodic treatments must be removed, a boiling 20% W/W

**Table No. 1**

*Government Specifications and ASTM Bulletins applicable to the various processes mentioned in the article.*

| | |
|---|---|
| MIL-Std. 171 | "Painting and Finishing: General Specification for the Production of Army Ordnance Material" |
| MIL-C-490 (Cleaning and Phosphate Treatments) | "Cleaning and Preparation of Ferrous Metal Surfaces for Organic Protective Coatings" |
| MIL-A-8625 | "Anodic Coatings, for Aluminum and Aluminum Alloys" |
| MIL-C-5541 | "Chemical Films for Aluminum and Aluminum Alloys" |
| MIL-C-13335 (HAE process) | Coatings for Magnesium and Magnesium Alloys" |
| MIL-M-3171 | "Magnesium Alloys; Processes for Control of Corrosion" |
| MIL-C-15328 (acid wash primer) | "Coating; Pretreatment" |
| ASTM-D870-54 | "Water Immersion Tests of Organic Coatings on Steel" |
| ASTM-B117-54T | "Methods of Salt Spray Testing" |
| ASTM-B287-54T | "Methods of Acetic Acid Salt Spray Testing" |

solution of chromic acid in water has proved satisfactory.

To produce a smut-free surface, *die castings* should be pickled in a chromic-nitric-hydrofluoric solution.

*For wrought products,* two pickling solutions have been successfully employed:—(1) Acetic-nitrate solution—A solution of glacial acetic acid and sodium nitrate in water to remove surface contamination and mill scale; and (2) Chromic acid-nitrate solution—This is used to remove burnt-on lubricants from hot formed parts after suitable alkaline cleaning. It can also be used to remove surface contaminations and mill scale, but it is not as efficient or economical as the acetic-nitrate mixture.

One of three commonly used and successful chemical conversion treatments may be applied to the magnesium after proper cleaning and pickling. The Chrome Pickle Treatment provides a very desirable matte gray to yellow-red iridescent coating which serves as an excellent paint base. The Sealed Chrome Pickle Treatment is the same as the Chrome Pickle Treatment except that it is sealed with dichromate after treatment. This sealing increases resistance to severe exposure conditions. The Hot Dichromate Treatment can be applied to all magnesium alloys except alloy "M". This treatment provides the best paint base of all the chemical treatments, but not as good as the anodic treatments. A properly applied coating varies from light to dark brown depending upon the alloy.

There are also three commonly used anodic treatments for magnesium:—(1) The Galvanic Dichromate Treatment; (2) The HAE Treatment; and (3) The Dow 17 Treatment. The Galvanic Anodic treatment is applicable to all alloys and produces a black coating. The HAE treatment produces a tan to brown coating on all magnesium alloys, while the Dow 17 treatment produces a greenish-tan to green coating on all alloys. Both the HAE and Dow 17 treatments produce a hard, glass-like coating which provides better protection and a better paint base on the magnesium alloys than any of the other treatments. However these glass-like coatings will spall under compression deformation unless applied very thin.

Magnesium parts can be satisfactorily used under most climatic exposures if they are properly pretreated and painted and if care is taken to prevent dissimilar metal contact. When a dissimilar metal must be installed in contact with magnesium, the metals electromotively closest to magnesium should be used, and actual bi-metal contact should be avoided by the use of vinyl or rubber tape or sealing compounds.

*Determining weight of experimental phosphate film on test panels. Weight tests are not always conclusive. Coating may have sufficient weight but still be porous or powdery.*

### Copper and copper alloys, tin and terne plate

Copper and copper alloys should be first cleaned free from soil by solvent, alkaline or emulsion cleaning, and then should be acid etched or sand blasted prior to painting. For pretreatment prior to application of a clear coating, buffing may be used, or there are a number of bright dips which will be satisfactory for the desired polished finish.

The final two metal surfaces which should be mentioned are tin and terne plate. Hot dip tin plate only requires cleaning to remove the soil. Electrolytic tin plate, from an alkaline stannate bath, should be rinsed in a hot chromic-phosphoric acid solution at a pH of 2 to 3 after cleaning. Terne plate should be given either a chromate or an oxalate treatment prior to painting.

The acid wash primer previously mentioned is a useful substitute when other treatments cannot be conveniently applied prior to painting. It works satisfactorily on all the metals mentioned in this article with the exception of magnesium. The author of this article has obtained poor results when using an acid wash primer on magnesium, but others claim results are improved when the phosphoric acid is reduced by 25 per cent.

Most of the metal treatments listed can be obtained from many surface treatment companies now supplying industry. If the instructions are properly followed, excellent results can be anticipated. Unfortunately, many users are careless in controlling the surface treatment processes. This can be remedied by proper education of processing personnel.

### Evaluating surface treatments

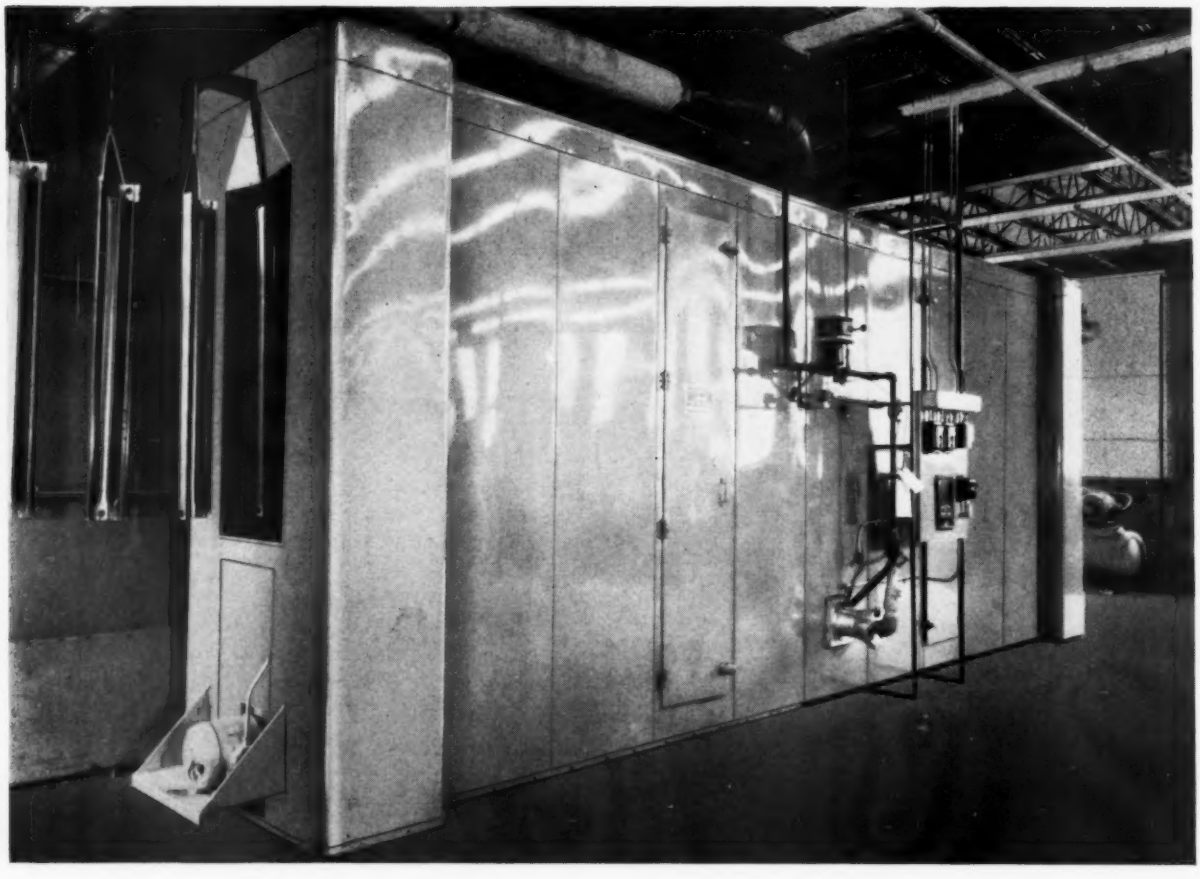
There are certain tests which can be useful to the paint technicians when they want to check the surface treatment. *First*—check by visual examination. Does the treatment have the appearance it is supposed to produce? Is it uniform and continuous? Is it powdery? *Secondly* — Determine freedom from oils and greases. The part which has been processed should be rinsed in running water and examined for discontinuity of the water film. If it is discontinuous there is an indication that the surface still has some grease or oil and the part should be reprocessed. The part should be thoroughly rinsed before this discontinuity check is made.

Coating weight checks can be run on phosphate and anodic coatings. However, this check is just an indication for the coating may exhibit sufficient weight despite the fact that it may be porous, powdery, or composed of too large crystals.

The best way to check any surface treatment is with the organic coating system applied over it, for this is the way it will have to exist during its service life. When possible, these tests should be run on the actual part. If panels are used, they should be of the same alloy as the part and tested along with a part.

*to Page 85* →

# INTEGRATION



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# A study of the characteristics of anodized aluminum

*by R. V. Vanden Berg* • HEAD OF THE FINISHES SECTION, ALUMINUM COMPANY OF AMERICA

THE wide variety of surface treatments available on aluminum makes possible many different finish characteristics, such as texture, color, specularity, diffuslvity, surface hardness, low contact resistance, or resistance to corrosion and erosion. Surface treatments based upon mechanical, chemical, electrochemical, organic finishing and porcelain enameling operations are some of the more important categories. Anodizing electrochemicallly produces films or coatings of essentially aluminum oxide on the surface of aluminum alloys.

At the present time, anodic coatings are used as a finish for many million pounds of fabricated alumiunm articles and structural parts. Anodic coatings can be formed on aluminum alloys in a wide variety of electrolytes utilizing many different techniques. The electrolyte which is most important for commercial application is the sulfuric acid electrolyte. Various techniques may be employed to produce anodic coatings in sulfuric acid electrolyte, resulting in a wide variety of characteristics for both functional and decorative applications.

### Surface preparation

Since anodic coatings are a type of conversion coating — that is, the metal surface is converted into essentially aluminum oxide by electrolytic action — the coating reproduces the texture from which it is formed. This, of course, is true to a varying degree with other types of applied coatings; however, in the case of anodic coatings they may be produced so that they are almost transparent. This fact places much more importance on the surface treatments used prior to anodizing than when opaque coatings such as electroplates, enamels or lacquers are applied. Since the surface pretreatment is of extreme importance from the appearance standpoint, and sometimes for its effect on functional properties also, it is essential that any discussion relative to anodizing also include some facts about surface preparation.

### Formation of the oxide coating

Important factors in the formation of the oxide coating include treatment time, current density, electrolyte concentration, electrolyte temperature and type of sealing. For example, some commercial coatings specify an anodic coating formed in a 15% sulfuric acid electrolyte at 70± 2°F at a current density of 12 amperes per square foot of surface area for 10 minutes and sealed for 10 minutes in water at 210 ± 2°F. Other commercial anodic coatings are formed under the same conditions except that the anodic oxidation time may be greater than 10 minutes.

One of the popular methods of designating an anodic finish has been in terms of total ampere-minutes per square feet. For example, certain commercial anodic coatings are designated as a 120 ampere-minute coating. The designation is the product of the time of anodic oxidation and the applied current density per square foot.

Both nominal thickness and weight of oxide coating per square inch of surface are extremely important for decorative and functional reasons. In general, thicker, heavier coatings have higher resistance to corrosion and abrasion than thinner, lighter coatings. Also, brightness and formability decrease as oxide thickness increases.

Coating thickness is dependent upon the time of anodic oxidation and the current density. For some trim applications anodic oxidation times in the range of 10 to 20 minutes are being used. Using a current density of 12 amperes per square foot, the nominal range of coating thickness is from .00015 inch to .00030 inch. With the alloys generally used for trim applications, the corresponding weights of such coatings range from approximately 7 to 14 milligrams per square inch of surface.

Anodic coatings of greater thickness and weight are used for un-maintained architectural applications. These coatings range from .0008 inch to .001 inch in thickness and approximately 35 milligrams to 45 milligrams per square inch in coating weights. Thicker and heavier anodic coatings can be applied by the "hard coating" processes.

Coating thicknesses in the range of .001 inch to .004 inch, with coating weights of 40 milligrams to 175 milligrams per square inch, are obtained for those applications which require extremely high resistance to corrosion and erosion.

Coating weight is affected by alloy composition. There is a wide range of coating weights, depending upon the alloy. Fortunately, alloys that are commonly utilized for trim applications usually produce high coating weights, provided correct finishing techniques are used.

The oxide coating that is formed is considered to be essentially aluminum oxide. It is formed by the reaction of the aluminum with the electrolyte when the aluminum is made the anode. Oxygen is liberated at the surface of the aluminum and oxidation takes place. The last-formed portion of the anodic coating is the innermost layer, and the first formed oxide is outermost. The oxide *grows into* the metal as the reaction progresses. This is directly opposite to the way electroplated coatings are formed since they *grow outward* from the surface.

Anodic coatings have a unique pore structure. These pores have an important influence on such characteristics of the coating as resistance to corrosion

and abrasion, and the ability to adsorb coloring materials. Coatings have a definite cellular structure and the size of the cell is determined by the type of electrolyte and formation voltage.

The presence of these extremely small pores, billions of them per square inch, oriented perpendicular to the metal interface, determine some of the characteristics of the coating. The size and number of pores are determined by the operating conditions. The important consideration is that the factors controlling these structural characteristics are well known and are practiced by responsible metal finishers.

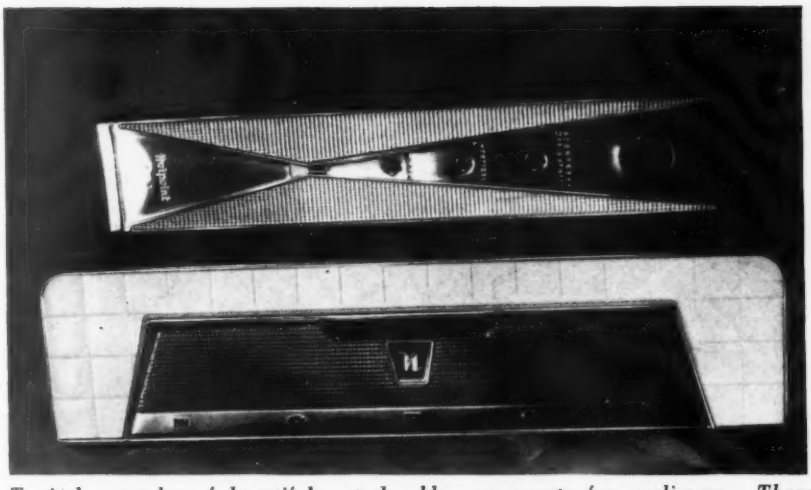
### Effect of alloy composition

The aluminum alloy and its metallurgical structure has important effects on the characteristics of the oxide coating. Not only does the alloy composition have a pronounced effect on the density of the anodic coating, but it also affects the appearance. Alloy constituents or impurities may impart coloration to the coating or an opaque rather than a transparent coating. The appearance of such coatings is dull and lacks a metallic luster.

### Appliance trim

Appliance trim is fabricated from 5357 alloy. This is an aluminum magnesium alloy which results in a slightly less transparent anodic coating with somewhat less metallic luster. Most important is the substantially lower cost of this alloy compared with the super purity alloys.

It is interesting to note the attractive combination of baked enamel and anodic finish utilized in the appliance field. This principle is, of course, not original since the combination is also used with chrome plated and other types of metal trim. The important consideration is that the anodic finish provides an excellent base for lacquer as well as air drying or baking enamels. No complicated "after treatments" are required to prepare the finish for the synthetic coating. Interior refrigerator applications are considered rather severe due to humidity conditions, yet such items are giving excellent performance. The selection of proper aluminum alloys is important for appearance and durability. There is a wide selection of alloys available for all commercial applications. They provide an extensive range of mechanical properties with high resistance to corrosion and a wide choice of finishing possibilities.



*Typical examples of beautiful, yet durable components for appliances. These alloys are made from aluminum of high purity with varying amounts of magnesium added to increase mechanical properties.*

For trim applications utilizing the anodic finish, alloys such as 1100, 3003, 5357, and 6063 are used. These alloys show excellent response to the various mechanical and chemical processes used in combination with anodizing treatments to yield a wide variety of attractive finishes. In general, 1100 alloy, due to its rather low mechanical properties, should be used in applications where resistance to denting is not a critical factor. Such applications are instrument panels and bezels or similar applications where "back up" of the item is possible.

A wide selection of embossed or coined surface patterns are available on mill finished sheet. These patterns are attractive and add rigidity to the sheet.

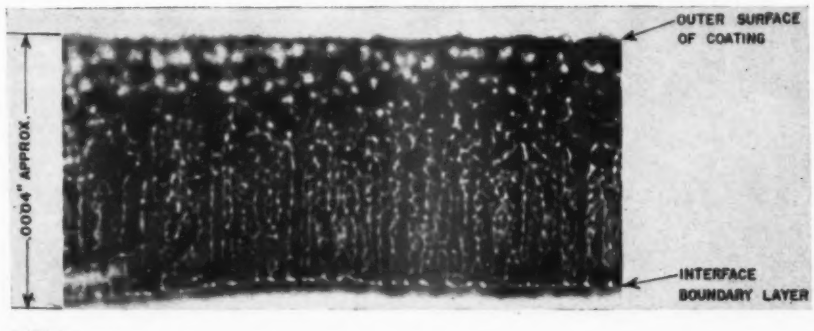
Alloy 3003 has excellent formability in combination with higher mechanical properties. This alloy is also available as pattern sheet and is recommended where a matte finish is required. Since 3003 alloy contains approximately 1.25% manganese, the anodic coatings formed from this alloy are not as transparent as those made from higher purity alloys. They, therefore, lack metallic luster, particularly in the thicker ranges.

### Forgings and castings

Forging and casting alloys also respond to anodic oxidation. Anodic coatings are generally applied to forging alloys for maximum resistance to corrosion or abrasion or to provide color for identification purposes.

Anodic coatings are applied to sand or permanent mold castings for both functional and decorative applications. These include architectural components, such as building spandrels, plaques, hardware and handrail fittings. Alloys such as 214, A214, B214, F214 are required for applications requiring the brightest anodic finish. The application of anodic finishes to sand and permanent mold castings is complicated by the porosity and coarser grain structure of these castings. Since anodic coatings are conversion type coatings, they tend to reveal the cast structure; consequently, it is impossible to achieve as bright or smooth an anodic finish as on wrought alloys. The inherent porosity of sand and permanent mold castings also complicates the coloring of anodic coatings.

*Photomicrograph 725X showing section through anodic oxide coating illustrating pore construction. Interface is at bottom; spongelike structure is at top and represents outside surface of anodic coating.*



## KEY TO TYPE OF SURFACE PREPARATION

| Suffix | Type of surface preparation |
|---|---|
| No suffix | As-fabricated surface. |
| A1 | Preliminary grinding and polishing prior to buffing. |
| A2 | Buff directly on as-fabricated surface. |
| B | Ground finish (round tubing only). |
| C1 | Satin finish, No. 180-220 emery or finer. |
| C2 | Satin finish, hand rubbed with steel wool. |
| C3 | Satin finishing compound. |
| D | Polish finish, No. 140-180 emery. |
| E | Ground finish, No. 120-140 emery. |
| G1 | Very fine sand blast (formerly "Dust Blast"). |
| G2 | Fine blast. |
| G3 | Medium blast. |
| G4 | Coarse blast. |
| K | Wire-brush finish. |
| M | Burnished finish. |
| N | Sand-burnished finish. |
| R1 | Caustic etch. |
| R2 | Caustic etch for diffuse reflectors. |
| R3 | Sulfuric-chromic etch. |
| R4 | Bright Dip (nitric-hydrofluoric). |
| R5 | Bright dip. |

*This table shows a nomenclature system for surface pretreatments used commercially for many years. When the smoothest, brightest surface is required, the designation "A1" is used. Matte finishes are "R1" or "R3", produced by acid, and those produced by sand blasting are designated "G1", "G2", "G3", or "G4".*

Although the use of anodic coatings on die castings is somewhat limited for decorative applications, anodic coatings are used extensively to provide increased resistance to corrosion and abrasion. Black anodic coatings are popular as a finish for die cast firearm components. Colors other than black are not too successful due to the composition of die casting alloys. The silicon in the popular die casting alloys such as 360 or 380 imparts a gray coloration to the anodic coating since silicon is present in the coatings as gray colored particles.

### Coloring anodic coatings

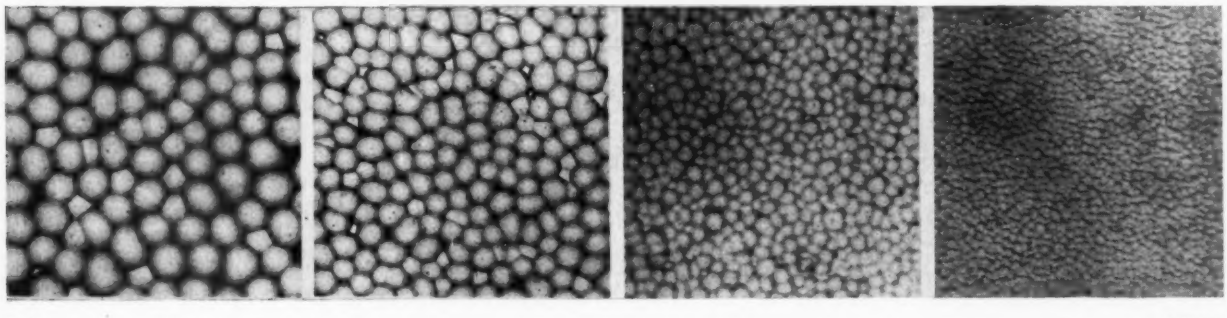
Attractive colors are possible since the reflection on the underlying metal gives a metallic sheen to the color. It is a well known fact that certain water or oil soluble organic dyestuffs will penetrate the fine capillaries of the oxide coating and will be adsorbed by the walls of the pores. Anodic coatings can be impregnated with pigments which color the coating gold, black, brown, yellow or blue. Corrosion inhibitors such as chromates or silicates are also absorbed to provide increased resistance to corrosion.

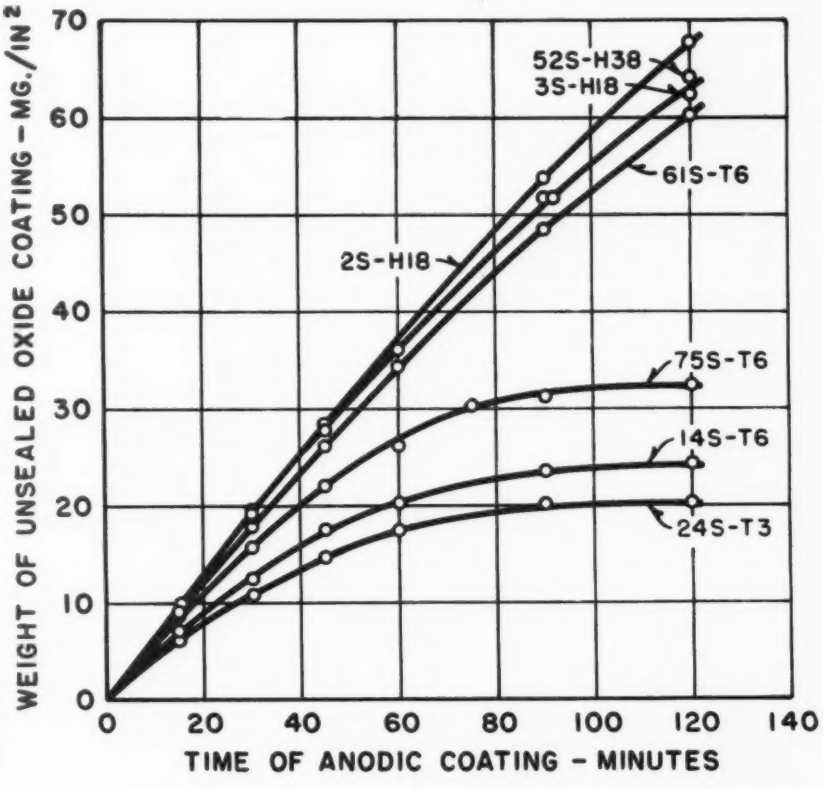
Since the colorants used for anodic coatings are generally water soluble organic dyestuffs, the question of durability or retention of color is an important consideration. In properly processed material, leaching or "wash out" of the colorant does not occur because the colorant has penetrated into and become adsorbed by the anodic coating. The final step in color processing insures color permanence. This step involves an immersion treatment in a boiling solution which reacts with the colorant and seals the pores of the coating. In the case of uncolored anodic coatings, it is also necessary to seal the pores so that the finish will be resistant to staining and corrosion. Generally, colors obtained with organic dyestuffs are considered to have inferior fastness to direct sunlight. This experience is based upon dyed fabrics, paper, plastics on wood or even anodized aluminum. There is, however, a wide variation in the light fastness of various types of dyes and there are some that have substantial resistance to sunlight.

### Control "appearance match"

Precision control of certain factors must be employed to assure color matching. The problem of color matching of colored anodic coatings is not only associated with the actual coloring step but is also related to the surface preparation and the anodic oxidation process. Since color matching involves many factors, a more logical term might be "appearance match." If close appearance match is desirable, then careful control of all surface preparatory treatments such as buffing, polishing, etching and brightening must be exercised. The anodic oxidation process must be controlled with respect to time, temperature

*This electron micrograph illustrates the cellular structure of the anodic coating. The size of the cell is determined by the type of electrolyte and formation voltage.*






*Standard anodic coating graph showing weight of coating, different alloys, vs. time.*

and agitation. The important factors to be controlled in the actual coloring process are time, temperature, pH and concentration of the coloring solutions. Proper instrumentation will provide adequate control of most of these variables. Automation in combination with instrumentation of the various cycles will eliminate the human element and provide a more consistent appearance match. Appearance match is the result of a concise specification, adequate control samples, careful control of variables and observation of recommended practices.

### Methods of application

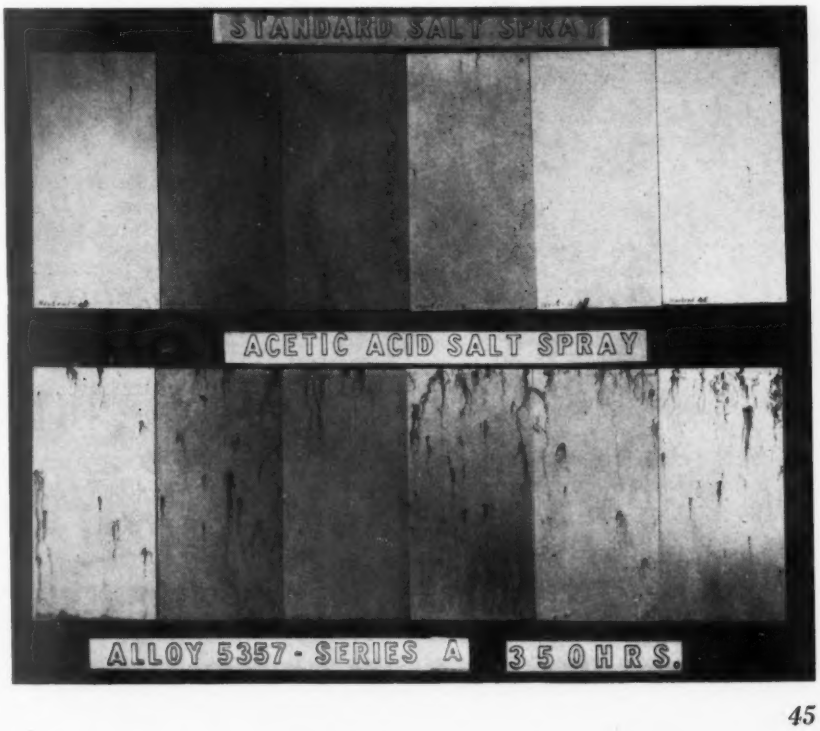
Since the oxide coating is a dielectric rather than a conductor, the initial contact between the rack or holding device and the surface must be maintained firmly throughout the anodizing cycle. Rack contact marks are never a problem if the finisher is acquainted with some of the important facts of the application. The most important, of course, is the surface to be exposed. This problem is much the same as with electroplating. In general, the anodic process has excellent "throwing power." Although anodic coatings will form on complicated contours, there are problems in connection with the application of anodic coatings to the interior of tubing and hollow shapes.

In general, the factor of increase in dimension is not important for trim application; however, as a matter of interest, it probably should be mentioned that the overall increase in dimension of a surface that has been anodized is approximately one-third of the coating thickness. This is due to the coating growing inwards instead of being deposited on the surface such as occurs in electroplating.

Consideration must be given to designs containing lap joints, small holes, porosity or any crevice which might entrap solutions. Here again the practice is similar to that employed in electroplating. Good rinsing is an important requirement for both anodizing and electroplating. If the design causes problems from the entrapment standpoint, there are techniques, particularly for coloring anodic coatings that will prove beneficial.

Anodic coatings may be applied to aluminum alloys by a variety of procedures, including batch, bulk, continuous, conveyor and continuous strip methods. All of these processes are in commercial production. The batch full continuous method is the most practical for high-production, low-cost finishing necessary for appliance applications. The equipment employed is much the

*to Page 85* →




*These test panels show the exposure characteristics of anodic coatings on 5357 alloy. Breakdown occurred in the acid type salt spray in about 42 percent of the standard salt spray time for plain and colored coatings.*

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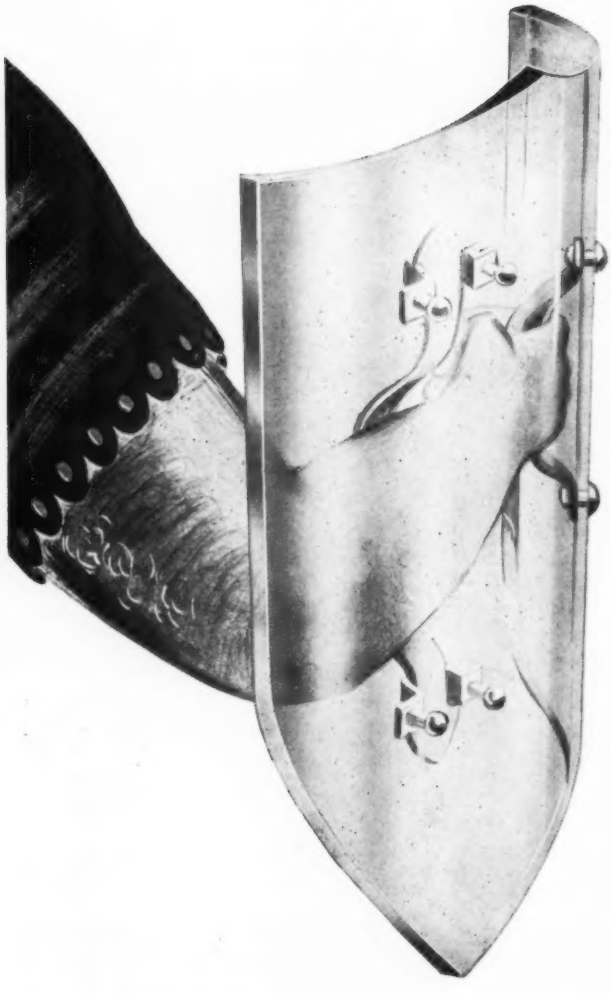

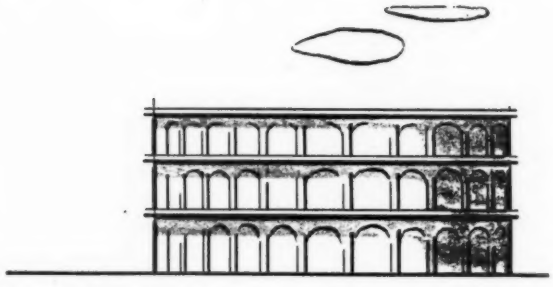

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# The automatic ice maker

## key to a revitalized industry

*by John H. Wall* • *EXECUTIVE VICE-PRESIDENT AND GENERAL MANAGER, SERVEL, INC.*

EXCLUSIVE MPM PHOTO

MPM EXCLUSIVE FEATURE

How can the average homemaker be made to feel dissatisfied with her present refrigerator long before it is actually worn out?

That is the crux of the serious problem which faces every refrigerator manufacturer. The problem is complicated by two facts:

(1) There is now almost complete saturation (96%) of the market for refrigerators;

(2) The industry's annual output of refrigerators is about four times the number of new homes built each year.

The obvious solution is for manufacturers to redesign their refrigerators for greater convenience and service so that the homemaker will want to replace her old refrigerator long before the end of its normal life of 10 to 20 years.

Servel firmly believes that the immediate future of the automatic refrigerator industry may very well depend upon the swift and growing acceptance of its Automatic Ice Maker. This unique device, introduced in Servel's 1953 line of absorption-type gas refrigerators, is the first completely automatic method of freezing ice cubes without trays, storing them in a container and replacing them as they are used.

While Servel was the first and is still the only manufacturer to offer the Automatic Ice Maker, there are indications that other manufacturers are seriously considering its use in one or more of their 1958 models.

### 73% vote for Ice Makers

In the course of approximately five years, public acceptance of the Automatic Ice Maker has climbed steadily. In each of the past 4 years Servel gas refrigerator models equipped with the Automatic Ice Maker have far outsold models that were not so equipped. In sizes where it was offered as optional, the Ice Maker was a heavy favorite.

These percentage figures bear out the Servel prediction made in 1953 that "the day may not be far off when ice trays will be collectors' items like whale-oil lamps and spinning wheels."

**HOW SERVEL OWNERS VOTED**

| | With Automatic Ice Maker | Without Ice Maker |
|---|---|---|
| 1953 | 59% | 41% |
| 1954 | 65% | 35% |
| 1955 | 67% | 33% |
| 1956 | 73% | 27% |

The Automatic Ice Maker is a completely new and different feature. It is the solution to a problem that has bothered the manufacturers of automatic refrigerators for more than 30 years. That problem has been concerned with the freezing and removal of ice trays.

While there have been improvements and refinements in the refrigeration systems and in cabinet details, most homemakers today are still freezing ice cubes in much the same way that they were frozen in the 1920's. It is still necessary for them to take the ice cube tray to the kitchen sink, fill it with water and then carry it back to the refrigerator. After the ice cubes are frozen, it is still necessary for most homemakers to use mechanical force or hot water to loosen the ice cubes from the tray.

Nearly a thousand patents are on file in Washington dealing with different ways to separate ice cubes from the tray or the tray from the refrigerator. Only a few have proven to be practical. None has been completely automatic. Because the Automatic Ice Maker *is* completely automatic, it offers families a convenience and a service they could not previously obtain. Because it offers families something they have never been able to get in a refrigerator, the Ice Maker could very well be the means of obsoleting all other refrigerators now in use.

Let me mention a few figures to indicate just how important it is for the automatic refrigerator industry to create demand for new models. According to the best statistics obtainable, the market for automatic refrigerators has reached a saturation point of 96%. More than 45 million homes are now equipped with automatic refrigerators, and less than 2 million are not so equipped. With an industry-wide production rate of approximately 4 million refrigerators per year, it is clearly evident that the future of the industry depends upon the successful development of the replacement market by encouraging families to replace their old refrigerators before they are worn out. It is obvious that new homes — currently being built at the rate of approximately 1 million per year — cannot absorb the output of the refrigerator industry.

### big cost reduction — packaged unit

One noteworthy fact about the Automatic Ice Maker has been the steady reduction in its cost. During the first two years that this feature was offered to Servel purchasers, it represented a differential of $70 between the suggested retail prices of models equipped with it and those not equipped with it. During the past two years this retail price differential has been cut to $50. There is every reason to believe that, with continued engineering improvements and increased volume production, the factory cost of the unit can be brought to as little as $15.

Design changes incorporated in the next version of the Ice Maker will make it easier to install and to service. The 1958 version will be front-mounted instead of rear-mounted, and the simple removal of two screws will make all parts of the device easily accessible.

Another result of recent design changes is the fact that the new unit will be a "package unit", assembled and installed on the production line.

A most important feature of the latest model is that it has been designed to fit into essentially any make of automatic refrigerator on the market.

On the basis of all these facts, it seems reasonably safe to predict that the refrigerator industry is on the threshold of a period of accelerated replacement sales, and that the Automatic Ice Maker will give refrigerator manufacturers an important tool they need to accomplish this desired result.

# Engineering details of the servel automatic ice maker

*by H. C. Shagaloff* • DEVELOPMENT ENGINEER, AND
*R. E. Deaux* • CHIEF ENGINEER, HOME APPLIANCE DIVISION, SERVEL, INC.

MPM EXCLUSIVE FEATURE

The following details cover the cycle of operation and a description of the principal component parts for the automatic ice-making mechanism.

### Cycle of operation

We start the cycle with the ice tray filled with water and the storage basket empty. When the water is completely frozen, the thermostat closes to its "cold" position, energizing the motor and gear train, the tray heater and the reset heater. The ejector blade begins to turn and continues for approximately 180°, until its blades come in contact with the frozen ice. Since it cannot move the frozen ice pieces, it causes the motor and gear train to stall. During the stall period, the reset heater causes the thermostat to return to its "warm" position. The stall continues until the heat from the tray heater has loosened the ice pieces, and then the ejector blade continues its rotation. During the second 180° of rotation, the ejector blade sweeps the semi-circular ice pieces from the tray, bringing them to rest on top of itself. The ejector blade has now reached its starting position, and because of the Geneva gear which drives it, it remains stationary while the motor continues to run and drive the timing shaft. A cam-driven switch operated by the timing shaft energizes the water valve, permitting water to flow into the empty ice tray. After a pre-determined length of time, the same cam de-energizes the water valve, the motor, the tray heater and the reset heater.

The ice pieces now resting on top of the ejector blade remain there while the next batch of ice is frozen. During that period, the outer surface of each ice piece is re-frozen since the ambient temperature around the ice pieces is approximately 0°F. Thus, when the next cycle starts, the rotation of the ejector blade causes these ice pieces to fall into the storage basket, and because they have been completely re-frozen they may be stored for long periods of time without sticking together.

The ice-making cycles continue until the storage pan is full, at which time the stop arm ball is above a predetermined level, and the electrical switch controlled by it is permanently opened. This prevents further operation of the ice-making mechanism until the user removes sufficient ice pieces to permit the stop arm ball to drop below a predetermined position.

Further details of the operation will become apparent from a study of the description of component parts, and the schematic electrical diagrams which follow.

### Component parts

The principal component parts consist of:

1. ICE TRAY — An aluminum die casting having a semi-circular interior, divided into seven compartments by partitions. Since water enters from the rear of the tray, each partition has an opening to permit all of the compartments to be filled. The bottom of the tray is flat, permitting it to be securely fastened to a refrigerated shelf.

2. REFRIGERATED SHELF — This shelf provides mechanical support for the ice tray (1) and is preferably refrigerated directly from evaporator coils. It is located at approximately the center of the vertical dimension of the freezer compartment of the refrigerator, in order to provide headroom for ejection of ice pieces, and space below for the storage basket.

3. TRAY HEATER — A ceramic-embedded, aluminum-sheathed line voltage resistance heater rated at 300 watts. The heater is embedded in a groove on the underside of ice tray (1), and is in good thermal contact with both the tray (1) and the shelf (2). This heater, when energized, melts the outer surface of the frozen ice pieces, so that they may be removed from the tray.

NOTE: Components (1) through (5) inclusive are assembled in the freezer section of the refrigerator, where the ambient temperature is about 0°F. The rest of the mechanism is assembled behind the rear of the evaporator, and covered with insulation.

4. STOP ARM BALL — The ball is adapted to be cam-driven to a top position during an ejection cycle and then released. In its released position it rests on top of the accumulated ice pieces in the storage basket and positions an electrical switch so that ice production proceeds until the storage basket is full. After the storage basket is full, the mechanism cannot be operated until sufficient ice has been removed to permit the stop arm ball to drop to a lower position.

5. EJECTOR BLADE—An aluminum extrusion machined to have seven blades extending from a central shaft, each blade adapted to sweep one of the compartments of the ice tray. The central shaft rides in bearings at the front and rear of the ice tray.

6. SUPPORT ASSEMBLY — A molded phenolic structural member. Its principal purposes are to provide a thermal break between the interior and exterior of the freezer section of the refrigerator, and to provide support and connecting means for the various components of the entire ice-making mechanism.

7. MOTOR AND GEAR TRAIN — A two-pole shaded-pole motor driving a reducing gear train, and having two output shafts: a timing shaft and an ejector blade shaft. The timing shaft operates cams which properly position switches throughout the cycle. The ejector blade shaft, connected to the timing shaft through a Geneva gear, drives the ejector blade and runs at approximately 3 rpm. The double-shafting permits the ejector blade to complete its cycle before the water valve (11) is opened. Accurate timing of the water valve is thus provided since the motor is "unloaded" and therefore running at its designed speed.

8. WATER VALVE SWITCH AND HOLDING SWITCH — One SPST and one SPDT leaf switch assembled in tandem and operated by a cam driven by the timing shaft.

9. STOP ARM SWITCH — A SPST switch operated by stop arm ball (4).

## SCHEMATIC WIRING DIAGRAMS

### the schematic diagrams show the electrical switching sequences as the Automatic Ice Maker goes through its cycle

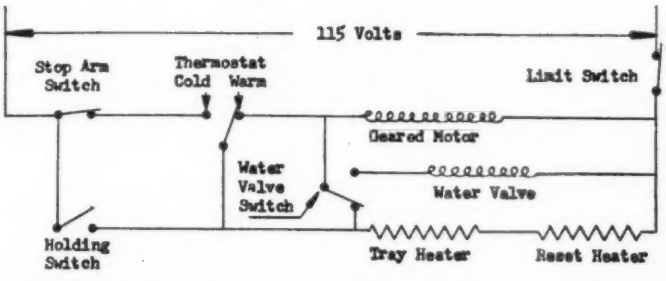



DIAGRAM NO. 1 *This diagram assumes that the storage pan is empty and the ice tray is filled with water. The stop arm switch is closed. The thermostat is "warm." The holding switch is open and the water valve switch is in the position shown as a result of positioning of motor-driven cams. All circuits are de-energized.*

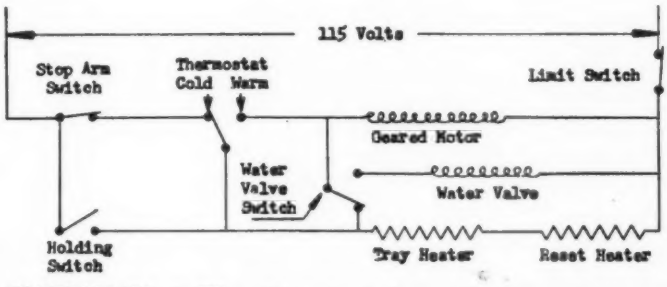



DIAGRAM NO. 2 *When the water is frozen the thermostat moves to its "cold" position, energizing motor, tray heater, and reset heater.*

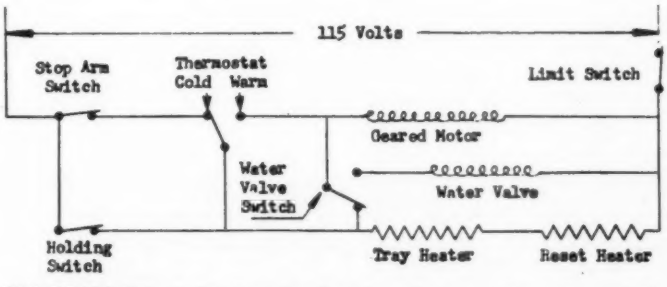



DIAGRAM NO. 3 *During the first few degrees of rotation of the timing shaft the holding switch is closed. The holding circuit assures the completion of the ice-making cycle, even though the stop arm switch is opened and closed as a result of the position of the stop arm and ball. The motor, tray heater, and reset heater remain energized.*

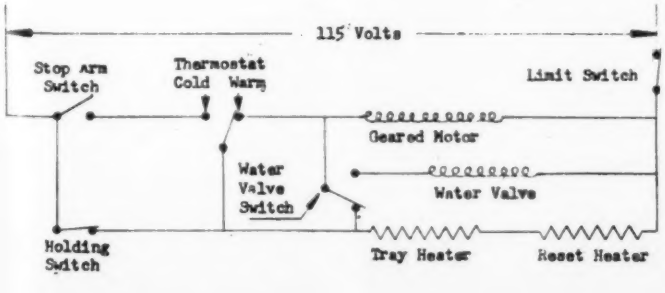



DIAGRAM NO. 4 *The ejector blades rotate to a position against the frozen ice and stall the motor. During this stall period the thermostat is reset to its "warm" position as a result of the heating effect of the reset heater. The motor, tray heater, and reset heater remain energized.*

←

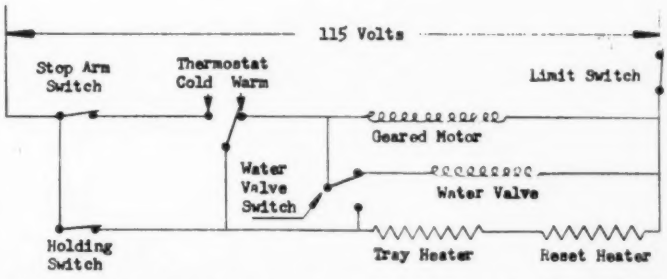



DIAGRAM NO. 5 *When the ice pieces are loose the ejector blade continues its rotation, sweeps the ice pieces from the mold, and stops due to the action of the Geneva gear. The motor continues to run, and a cam on the timing shaft reverses the position of the water valve switch. The motor, tray heater and reset heater remain energized and, in addition, the water valve is energized to feed water to the empty ice tray. NOTE: If the thermostat has not reset to the "warm" position (as, for example, in the event of lost charge in the diaphragm system), the motor and water valve are de-energized. Since the tray heater remains energized, the system will cycle on the limit switch until service is rendered. This feature avoids the possibility of flooding the evaporator in the event that the thermostat cannot be reset from its "cold" position.*

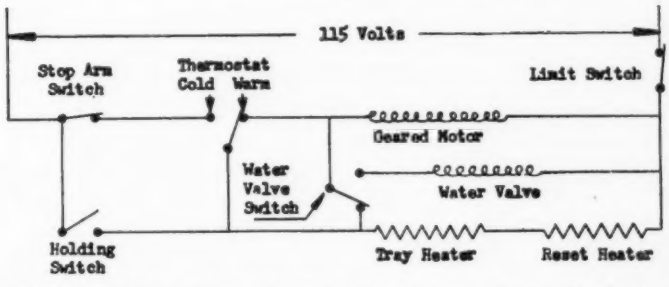



DIAGRAM NO. 6 *The cycle ends when the cams driven by the timing shaft simultaneously reverse the position of the water valve switch and open the holding switch. This de-energizes all electrical components and the mechanism is ready for the next cycle.*

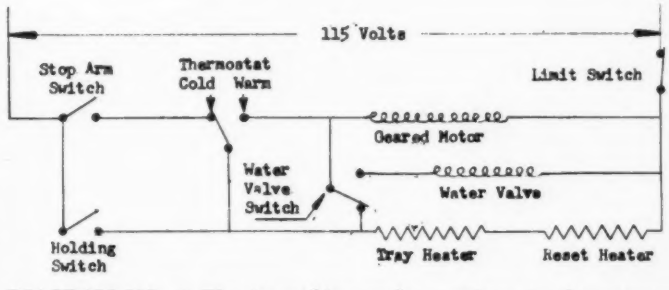
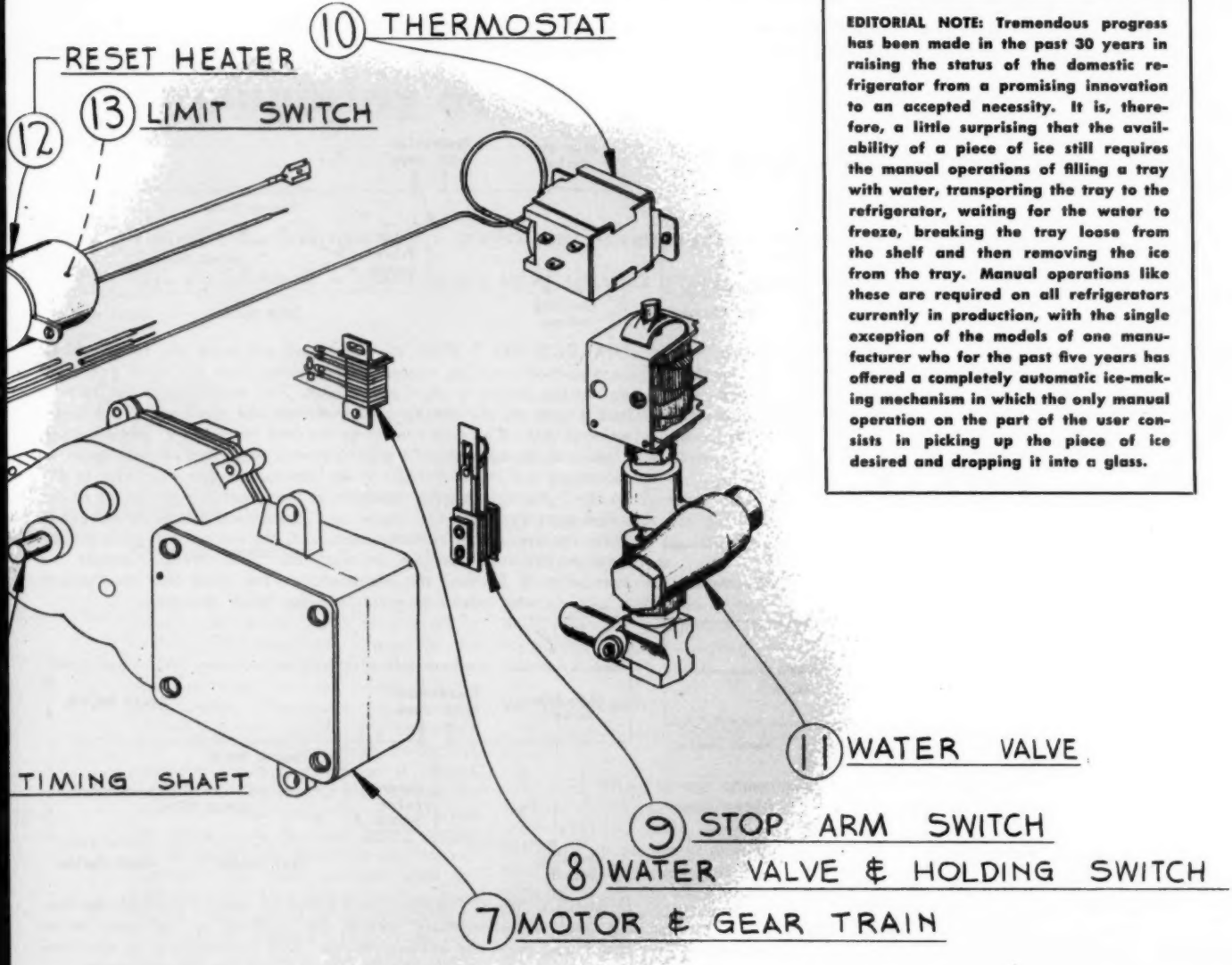



DIAGRAM NO. 7 *The ice-making cycles continue in the manner described in the first six diagrams until the storage pan is full. The position of the stop arm and ball now keeps the stop arm switch open. The water in the ice tray freezes, and the thermostat closes to its "cold" position, but the cycle does not start, as shown in Diagram 7. However, when the user has removed sufficient ice pieces to permit the stop arm switch to close, a cycle begins immediately.*




**EDITORIAL NOTE:** Tremendous progress has been made in the past 30 years in raising the status of the domestic refrigerator from a promising innovation to an accepted necessity. It is, therefore, a little surprising that the availability of a piece of ice still requires the manual operations of filling a tray with water, transporting the tray to the refrigerator, waiting for the water to freeze, breaking the tray loose from the shelf and then removing the ice from the tray. Manual operations like these are required on all refrigerators currently in production, with the single exception of the models of one manufacturer who for the past five years has offered a completely automatic ice-making mechanism in which the only manual operation on the part of the user consists in picking up the piece of ice desired and dropping it into a glass.

*R. E. Deaux, (left) chief engineer, Servel Home Appliances, and H. C. Shagaloff, development engineer on the Automatic Ice Maker.*

10. THERMOSTAT — A SPDT remote bulb type of controller adjusted to switch at 25°F on lowering temperature and 35°F on rising temperature.

11. WATER VALVE — A solenoid valve which in the energized position passes water from city mains to ice tray. It features a built-in water pressure regulator so that the quantity of water passed is directly proportional to time.

12. RESET HEATER — A resistor wired in series with the tray heater (3) and rated at 10 watts. As the name indicates, its purpose is to reset the thermostat (10) from the "cold" to the "warm" position.

13. LIMIT SWITCH — A bimetallic, automatic reset switch set to open at 125°F. This is a safety device which de-energizes all electrical components in the event of high temperatures occasioned by improper functioning of some component.

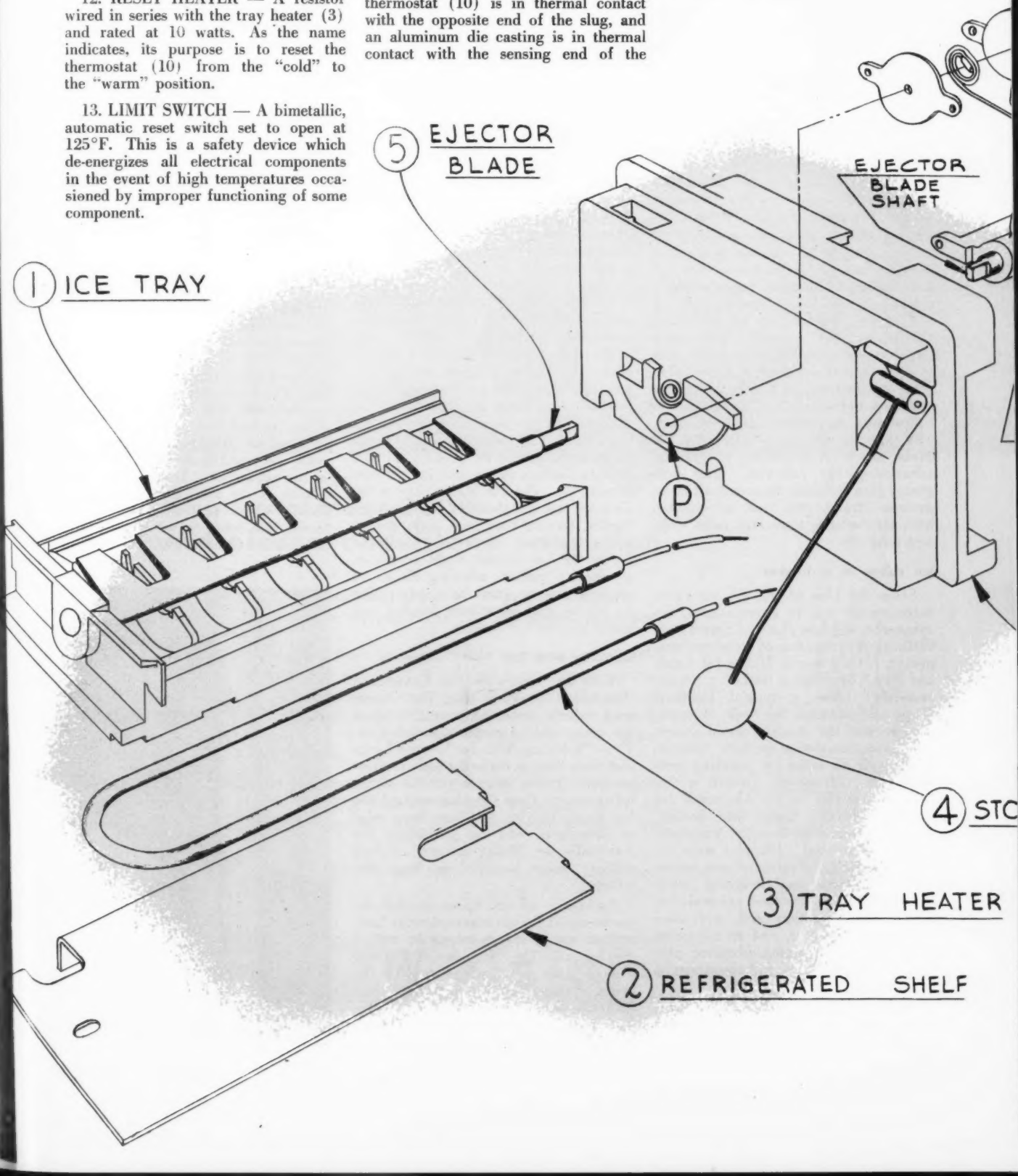
**Last-Spot-to-Freeze**

It will be noted that all of the ice pieces are in good thermal contact with the refrigerated shelf (2), with the exception of the rear face of the rear ice piece, which is in contact with the front face of the phenolic support assembly (6). The rear ice piece is thus the last to freeze. The point "P" on the support assembly (6) indicates a small aluminum slug which is molded into the support assembly. The sensing end of the thermostat (10) is in thermal contact with the opposite end of the slug, and an aluminum die casting is in thermal contact with the sensing end of the thermostat. The reset heater (12) and the limit switch (13) are also in thermal contact with these components. Thus, the temperature sensing area is designed to:

1) Withhold the start of a cycle until all the water in the tray is frozen;

2) Reset the thermostat so as to be ready for the next cycle; and

3) De-energize the entire system in the event that it is not functioning normally.



# A three-phase "ice maker" sales program

*by R. B. Robinson* • MANAGER OF MARKETING, HOME APPLIANCE DIVISION, SERVEL, INC.

WITH the introduction of the Servel Automatic Ice Maker Refrigerator to Servel distributors and gas company officials in December, 1952 began a full schedule of advertising in national magazines and trade papers. In each advertisement the Automatic Ice Maker has been the focal point to take advantage of this dramatic, exclusive feature.

The initial campaign included 48 color pages in 22 national magazines, reaching a total circulation of 405 million copies. The trade paper schedule opened with a 12-page insert in all major papers, followed up by ads timed throughout the season. Sixty-seven pages appeared in Retailing Daily, with a well-rounded schedule in seven other trade magazines. In the local markets, over one and one-half million dollars in cooperative advertising, plus an extensive key-city program, told the Ice Maker story. A continuing program of advertising has followed. The integrated plan included the coordination of national, trade, and local advertising, with point-of-sale materials, sales tools, and publicity.

### Ice cubes in a basket

Since the idea of making ice cubes automatically was an unprecedented development, the first phase of Servel's advertising program was of an educational nature. "Only Servel Makes Ice Cubes and Puts Them into a Basket . . . Automatically!" was a typical headline. These ads explained the cycle of operation so that the readers would understand how this device worked. Coordinated with an extensive publicity program, this advertising created a tremendous interest in the Automatic Ice Maker and built traffic into dealers' stores to actually see how the Automatic Ice Maker worked. Displays were coordinated with the national program to assist salesmen in presenting their demonstrations of this new convenience. Special demonstration aids and sales tools were developed, and an expanded retail salesman training program prepared salesmen to take full advantage of this new, exciting feature.

The second phase of the Servel program emphasized the convenient aspect of the Automatic Ice Maker with the headline "No Trays to Fill . . . No Trays to Spill . . . No Trays to Forget to Refill." The advantage of being able to reach in and take one ice cube or an ice bucketful was stressed in advertising, point-of-sale pieces, and literature. For example, plastic replicas were made of the Ice Circles, Servel's term for the half-moon shaped ice from the Ice Maker. These plastic Ice Circles were used with the story of "One Ice Circle", a demonstration developed for salesmen to show the advantage of ice cubes with no messy trays. Again, national, trade, and local advertising was coordinated to dramatize the convenience theme.

The third phase in the Automatic Ice Maker advertising program was to show new uses of ice that were made possible by the convenience of ice from the Ice Maker. The Ice Magic Service Set was introduced. This premium was designed to help the housewife prepare unusual and glamourous dishes utilizing the convenient ice. The Ice Magic Service Set included an ice crusher, insulated ice bucket, serving tray, and eight double compote glasses. An extra adaptor lid fitting the ice crusher could be placed on the ice bucket, allowing ice to be crushed directly into the bucket. The ice bucket was beautifully finished and could be used for serving.

### Cooking with ice

With this service set was furnished a four-color "Cooking With Ice" recipe book which contained over 100 ideas for using ice in preparation of food. These "Cooking With Ice" recipe books also were used as traffic builders to draw prospects in for demonstrations of the refrigerator. Over 10 thousand of the Ice Magic Service Sets have been used as premiums, and in promoting the Automatic Ice Maker feature. A half million recipe books have been distributed.

Assistance of the home service departments of the gas companies has been utilized to great advantage in selling the feature. The "Cooking With Ice" idea provides an unusual feature for the home service girls' demonstrations, and naturally leads to publicity of the refrigerator. A similar tie-in has been made with TV homemaker programs which demonstrates the "Cooking With Ice" recipes, and offers the Ice Magic Service Set as a prize on the program.

In addition to these activities, Servel has closely cooperated with the American Gas Association in our national advertising and promotional activities. These include four-color ads in national magazines, the Mrs. America Contest to select the outstanding homemaker of the nation, the New Freedom Gas Kitchen Program, and participation in many conventions and exhibits.

Through the continuing campaign of the last five years, the Automatic Ice Maker has been the key feature. It was an exclusive advantage when it was introduced and even now, five years later, only Servel makes and serves ice cubes automatically. The Automatic Ice Maker is the eye-catching feature in all advertising and displays. It provides dramatic demonstrations on television or on the sales floor. It sparks the imagination of the retail salesman. It is a word-of-mouth advertising builder and feature that every Servel owner likes to demonstrate to his friends.

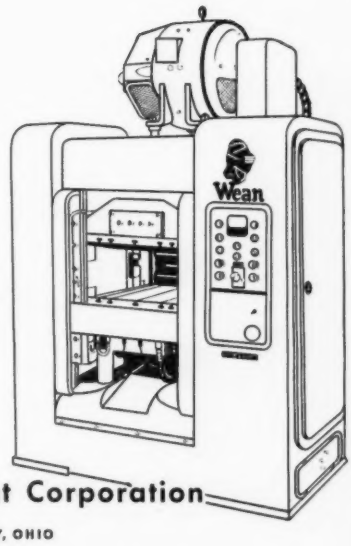
# Production up almost 300% on compound pierce-and-blank operation

**Production Rate:** **Conventional press — 90 pieces a minute**
**Wean "Flying Press" — 335 pieces a minute**

The piece illustrated above is a circuit breaker cradle stamped out of .064 gauge strip steel. Length of index was 1¼". Involving a compound pierce-and-blank operation, it was produced on a conventional press at the rate of 90 parts per minute at the Westinghouse plant in Beaver, Pennsylvania. Using the same dies in a 60-20-36 "Flying Press", Westinghouse increased production to 335 parts per minute.

Speed, however, is only one phase of the "Flying Press" story. Automatic operation, centrally located controls, greatly reduced maintenance — all combine to make this the most remarkable press development since the turn of the century.

The whole story is covered in detail in the Wean "Flying Press" Brochure. Write for it today.




**Wean Equipment Corporation**
CLEVELAND 17, OHIO

BLANKING | PROGRESSIVE BLANKING | COMPOUND PIERCE-and-BLANK | PROGRESSIVE DRAWING | PROGRESSIVE FORMING



## The New "GRAYS" have it!

By popular demand, the new gray vitreous enamel ground coats — for washing machine tubs and stove interiors — win out over the old blue blacks. They're much more attractive... modern... and sales-getting. But, equally important, they have better alkali resistance.

Using TAM OPAX* & OPAX S* as the mill addition opacifier provides excellent results.

In addition to uniformly good opacity, texture and gloss... better enamel working properties — not obtainable by any other means — are reported. Trial quantities of OPAX* are available for tests under your own operating conditions. Write our N.Y.C. office.

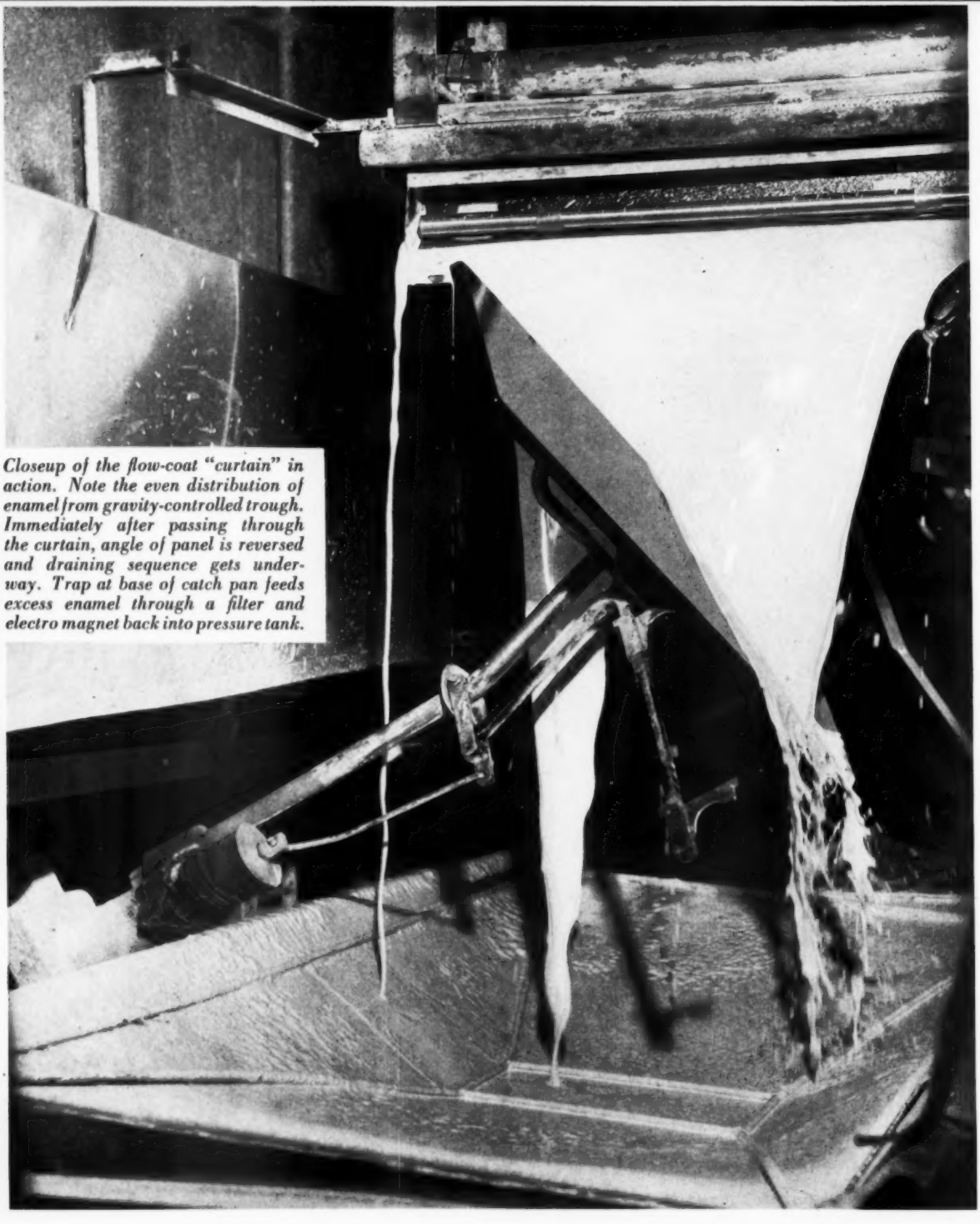
**TAM PRODUCTS**
Registered U. S. Pat. Off.

**TITANIUM ALLOY MFG. DIVISION**
**NATIONAL LEAD COMPANY**

*Executive and Sales Offices:*
111 Broadway, New York City

*General Offices, Works and Research Laboratories:*
Niagara Falls, New York

*Registered trademarks



*Closeup of the flow-coat "curtain" in action. Note the even distribution of enamel from gravity-controlled trough. Immediately after passing through the curtain, angle of panel is reversed and draining sequence gets underway. Trap at base of catch pan feeds excess enamel through a filter and electro magnet back into pressure tank.*

PHOTOS BY WALT CRAIG

# Flow coating porcelain enamel at General Electric Appliance Park

**"today and tomorrow in range enameling at GE" as described by engineers of the range department at Appliance Park, Louisville, Ky.**

MPM EXCLUSIVE FEATURE

TODAY, "flow-coat;" tomorrow, one-coat! Here, in two short phrases, is a summation of the production status of enamel finishing in the Range Department of General Electric's Appliance Park, according to plant executives of the department. For, while the flow-coating process is presumed the most advanced in the industry, a pilot production line which was set up to literally revolutionize appliance finishing is already in operation. The project? Elimination of the ground-coat now essential to enameling.

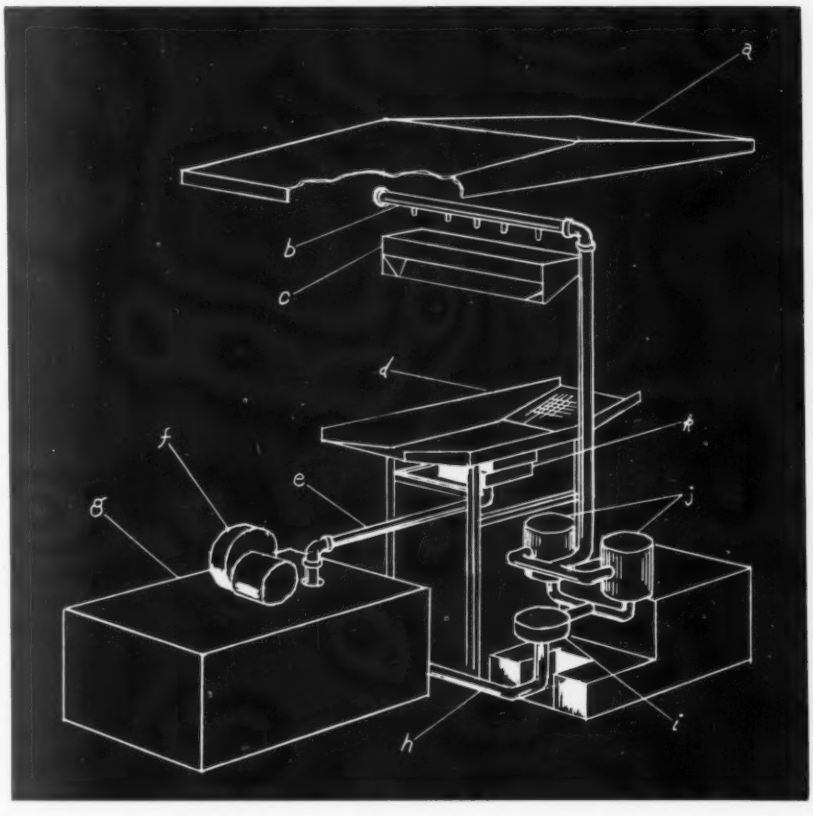
The one-coat method is figured for production-line installation in mid-1958. In the meantime, the GE-developed flow-coat process continues to chalk up substantial savings and afford greater operating flexibility over previous techniques.*

There are four methods now being used to some degree at Appliance Park to apply porcelain enamel to appliances: dipping, spraying, electro-static spraying, and the "flow." In dipping, of course, the ground coat parts are completely immersed in the slip in the conventional manner, removed, and allowed to drain. Hand spraying, because it allows for controlled application and flexibility, is used for finish coating of range bodies and cook tops. However, this process involves some problems; the operator must be highly skilled, material losses are hard to control, etc. These problems often assume significant proportions at GE. For example, relocation of personnel necessitates an expensive, continuous spray-operator training program. Because of overspray, there is a 150 per cent applied weight loss. Automated electro-static spray equipment is being tested on a limited production basis.

*Front panels only. GE fabricates a unitized body of which end panels are an integral part.

**PORCELAIN ENAMEL FLOW COAT UNIT**

*(side splash guards removed)*



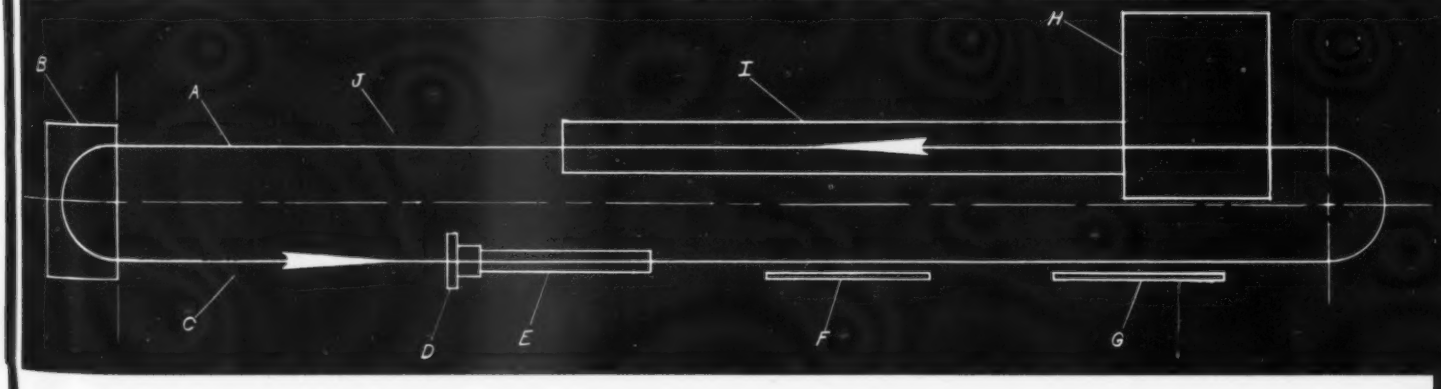

**ABOVE**

A. Dust Canopy
B. Header
C. Spreader
D. Screen
E. Return Flow
F. Agitator
G. 90 Gal. Storage Tank
H. To Pump
I. Pump
J. Magnetic Separators
K. Lump Breaker

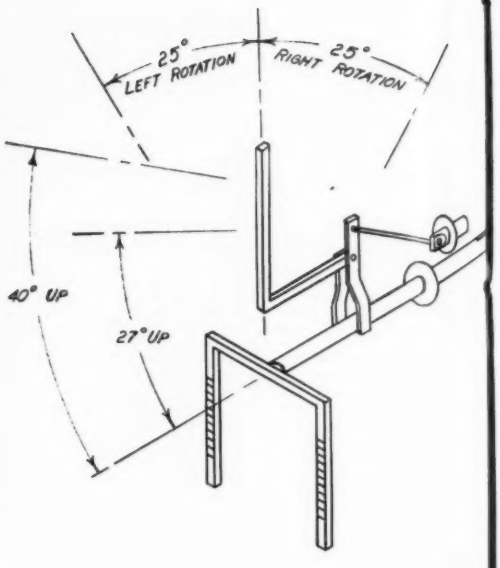
**BELOW**

A. Conveyor
B. Carrier Washer
C. Parts Loading
D. Flow Curtain
E. Dip Trough
F. Upper Drying Lamps
G. Lower Drying Lamps
H. Touch-Up Spray Booth
I. Infra-Red Drying Oven
J. Parts Unloading

**PLAN VIEW OF FLOW COAT SYSTEM**




CRAIG




*First station of the GE "flow-coat" line shows operator hanging panel on patented work carrier. Fingers on carrier automatically adjust for a firm grip, then rotate panel into position for the trip through the enamel "curtain."*

GE planning engineers found the solution to many of their problems in the flow-coat process. The principle is simple enough, as all finishing men know; range panels are moved through a liquid "curtain" where a controlled amount of enamel "flows" on, drains, and sets. But, while today's production line is simplicity itself, setting it up was something else again.

Not that flowcoating of an enamel slip is new. Actually, GE planners say they have been working with it for more than 10 years. Before that, it had been used for many years within the paint industry. GE engineers say that it was not until after World War II, when the introduction of titania into porcelain enamel formulas produced increased opacity, that it was possible to obtain a satisfactory coating by "flow" onto a piece of metal.

### First production application in 1953

First production-line application of the process to porcelain enameling was made in 1953, when a machine was developed to flow-finish the GE dishwasher tub. In 1955, using a machine developed at Fletcher Enameling Company, work was begun on adapting the process to range panels. A pilot line was installed in April, 1956, and in August flow-coating was applied to full production of 1957 range panels.

### Step-by-step breakdown of flow-coat finishing method

Panels are taken from the ground-coat furnace chain and checked for lumps, burn-offs, and other defects. Approved units are then moved by conveyor to the first station of the flow-coat production line. Here they are stoned by hand and placed on a work-holder.

These work-holders, developed by Industrial Automation Company, provide the built-in versatility needed to accommodate six different panel sizes. Y-shaped devices, their upper prongs fit under the top flanges of each panel; the third prong, activated by an automatic spring, adjusts along a specified axis until it fits snugly under the bottom flange. (See diagram)

The firmly-gripped part is then moved into position for a trip through the "curtain" where it is bathed in a controlled stream of enamel. 10 to 11 gallons of slip per square foot per minute are applied to the panels. Immediately thereafter, it is rotated along both horizontal and vertical planes so that excess enamel flows off evenly, leaving a uniform finish sans drain lines. Two banks of infra red lights, using GE quartz infra-red lamps with gold reflectors, provide controlled setting before the wet-beading (hand) and touch-up (spray) stations are reached and the parts move into a vented dryer.

Designed by GE engineers, the dryer is a large cylinder containing six banks of infra-red lights. Total capacity is 288 kilowatts, but each bank can be operated independently to provide maximum control of the drying process.

On emerging from the dryer, panels are brushed: enamel around corners and some edges are removed to reduce chipping tendencies. They are then inspected, taken from the line and hung on conveyors headed through one of three enameling furnaces which service all of the component parts of each range.

The application work-holders are moved through a water cleaning bath before they begin the continuous production trip again.

Key operation in the flow-coat process involves the enamel "curtain". The unit consists of a tank into which liquid enamel is delivered, and then pumped to an overhead distribution trough. (See diagram) A variable slot opening in the bottom of the trough provides a gravity-controlled curtain of enamel. After flowing over each part, excess enamel drains through a filter screen and magnetic separator back into the original tank.

### Control of color

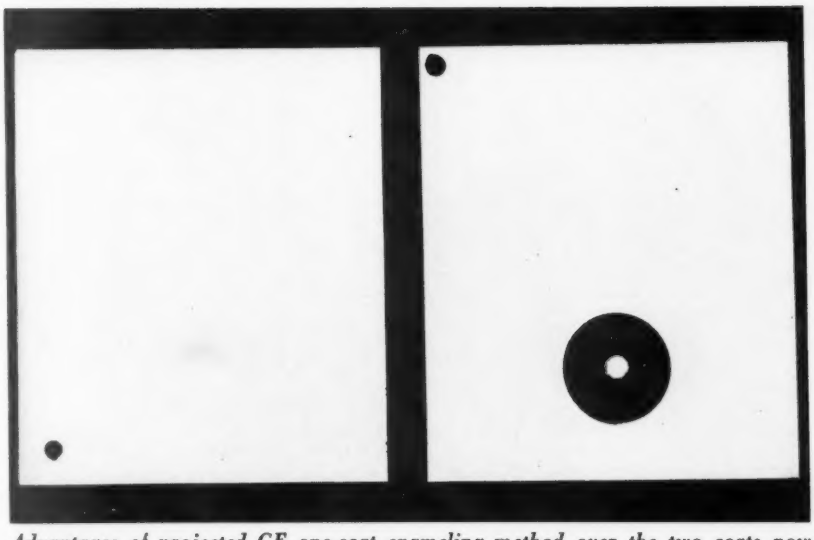
An interesting aspect in the development of the process involved color engineering. During the test stages, it was

found that flow-coated panels did not match parts which had been spray-finished, despite the fact that the same formula was used. Differences in weight of the applied coats changed the measure of reflectance. To solve the problem, adjustments were made in both the porcelain formula and the temperature treatment of flow-coated panels.

Where spray-finishing of panels used to require nine operators, the flow-coat line functions with only six. It also requires only two-thirds the area used for the old style operation. In addition, the loss of enamel occasioned by overspraying has been almost completely eliminated. But, most important, the controlled application achieved with flow-coating makes for a thinner, more uniform, more durable finish.

Flow-coating is also an integral part of the one-coat process now in final pre-production tests at Appliance Park. In the Range Department alone, (research is also being conducted by other departments), more than $100,000 has already gone into the machine phases of this revolutionary project. Not only will the need for a ground-coat be obviated, but tests indicate that the resultant finish will be stronger, more uniform and, by comparison, practically chip proof. In the new process, all range parts will be pre-treated and sent through a straight-line, single-firing production facility. Firing capacity will be more than doubled, a factor which GE expected to increase its position in the range sales picture.

A fitting achievement, indeed, for engineers working in an atmosphere where "progress is our most important product."



*Advantages of projected GE one-coat enameling method over the two coats now common to appliances is illustrated by this experiment. Using a 1" diameter steel ball, pressure of 2500 psi was applied to both panels. Note how finish literally "flowed" into the depression in the one-coat panel (left). Both coats disappeared under pressure applied to the other.*

*Interior of the GE flow-coat dryer as seen from the touch-up spray booth. Note up-and-down squared position of panels as they move along the line. Banks of infra-red lights angled above and below panels insure even drying along edge. Total capacity is 288 kilowatts, but each bank can be operated independently to provide maximum control of the drying process.*

**Porcelain Enamel Data**

| | |
|---|---|
| Specific gravity of slip | 1.66 |
| Rate of flow gal./sq. ft./min. | 10-11 |
| Application weight-dry-gms./ sq. ft. (18 large part to 23 small part) | 18-23 |
| Final vitreous coating thickness in mils | 4-5 |

**NEXT MONTH**

Tests for Evaluating Resistance to Steam Condensate on Porcelain Enamel, by J. A. Schiefferle, includes equipment, test procedures.

# McDANEL

## MILL HEAD ASSEMBLIES

## COVER *all* METAL—keep batch pure

View of McDanel Special Frame Brick and Door Blocks

View of McDanel Combination Grinding and Discharge Door

Solid McDanel Door for Dry Grinding

• McDanel Mill Head Assemblies can be installed any time you reline your mills. McDanel Mill Head Assemblies allow no metal to contaminate mill charge. The specially designed, overhanging-type frame brick and door block completely covers all metal parts. McDanel Mill Head Doors need not be removed to discharge when wet grinding. Replace grinding plug with perforated discharge plug for quick, easy discharge. No partially ground material around doors can unbalance batch uniformity. Dry grinding door is similar but has no hole in the center. Make a note to install McDanel Mill Head Assemblies next time you reline a mill. Specify McDanel Mill Head Assemblies when you purchase new mills.

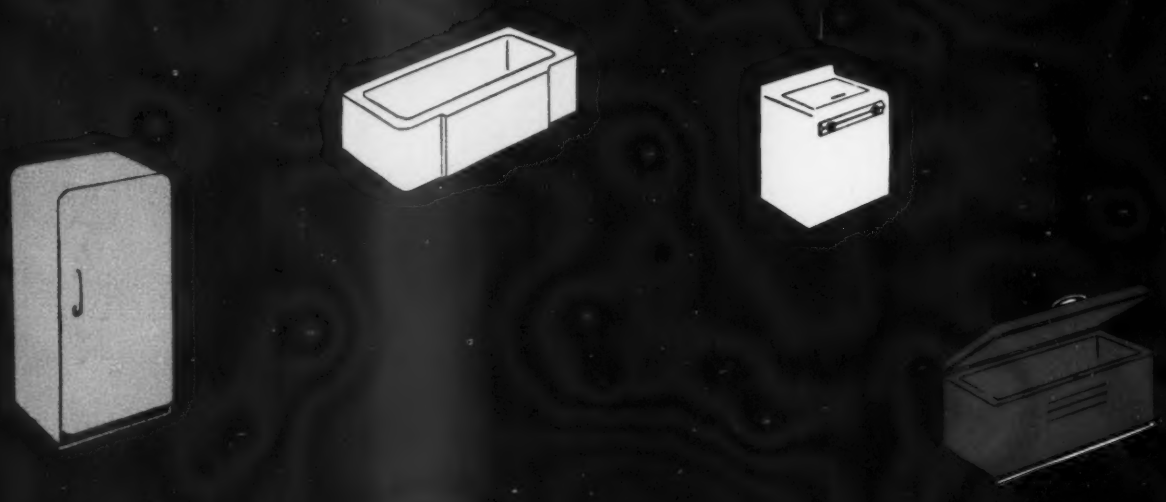
Write For Your McDanel Industrial Porcelain Catalog Today!

McDANEL Industrial PORCELAINS

# McDANEL


REFRACTORY PORCELAIN COMPANY

BEAVER FALLS • PENNSYLVANIA



# THERE'S NO COLOR SYSTEM LIKE TINT-TANIUMS

Tint-Taniums have firmly established themselves in regular daily production in some of the nation's most respected appliance manufacturing plants. These colored frits, made exclusively by Chicago Vit, provide a number of distinct production advantages foremost among them being unequalled color stability. They are handled as easily as white titanium frits, and completely eliminate the chance for human error that exists in systems where colors are added at the mill. Tint-Taniums also bring you economic advantages, and give your finished products fresh new sales appeal. So, if you plan to use colors in your new products, you'll find it profitable to choose Tint-Taniums. There's nothing else like them!

Chicago Vitreous CORPORATION

1425 South 55th Court • Cicero 50, Illinois


# Hook 'em on Inconel for in-furnace safety

Notice these little 3/16 inch diameter "S" hooks?

The plant superintendent of California Metal Enameling Company (Cameo) reports they last four times as long when made of Inconel* nickel-chromium alloy. That's in Cameo's continuous furnace, 1500°—1600°F.

Big thing, though, is not Cameo's saving in burning hook expense. It's their saving in spoiled ware and lost furnace time. With these lightweight Inconel alloy hooks, droppage of ware and pile-ups in the furnace prove rare. The hooks don't shed scale either.

**Inconel provides two-fold protection**

1. **It retains its strength under sustained high temperatures.**
2. **It resists corrosive attack and scaling by furnace atmospheres.**

For conditions like these, specify Inconel alloy burning tools and fixtures. Your fabricator can form them readily in wanted shapes. Inconel alloy welds well, too.

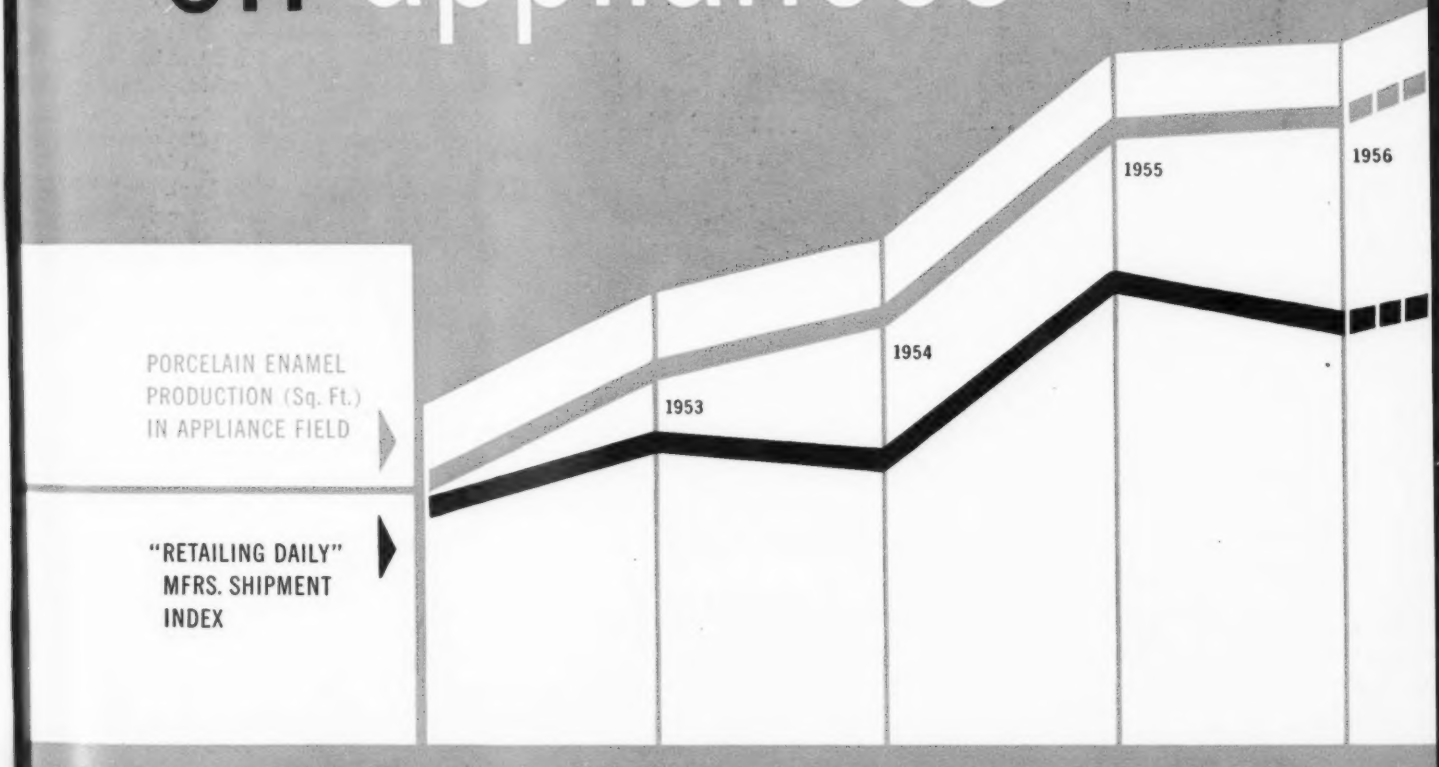
*Registered Trademark

**More information?** Write today for "Keeping Costs Down When Temperatures Go Up." This Inco booklet contains many practical suggestions on extending equipment life.

**The International Nickel Company, Inc.**
67 Wall Street New York 5, N. Y.

**Inconel**... *for long life at high temperatures*

# Big things *are happening in* porcelain enamel on appliances




FERRO

## FERRO CORPORATION

CLEVELAND • NASHVILLE • LOS ANGELES
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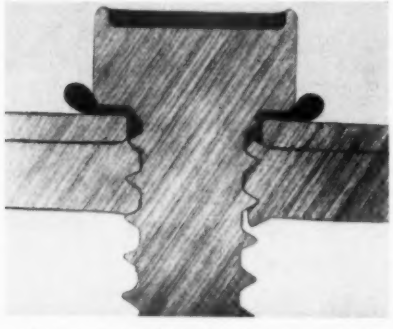
**WORLD'S ONLY COMPLETE PORCELAIN ENAMELING SERVICE . . . including Plant Layout . . . Furnace Design and Construction . . . Product Design Assistance . . . Enamel Selection . . . Color Matching Service . . . Plant Start-Up Supervision . . . Production Trouble-Shooting . . . Cost Analysis Field Studies . . . Porcelain Enameling Materials and Supplies.**

# New Supplies and Equipment

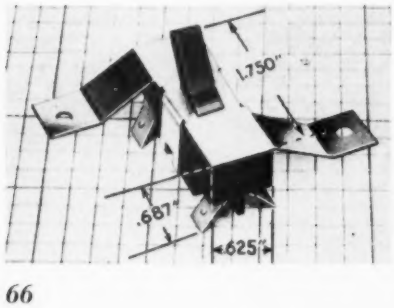
## FASTENER-SEAL FOR APPLIANCES, EQUIPMENT



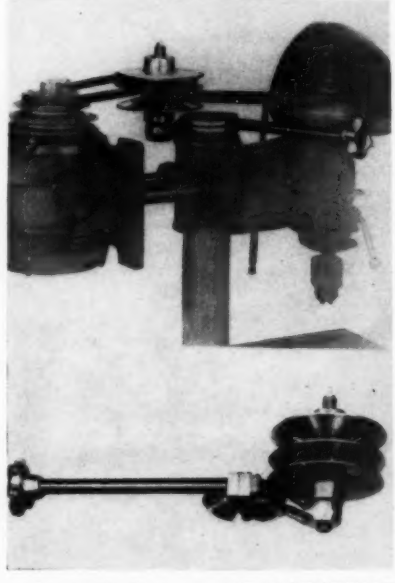
A "controlled-flow" fastener-seal designed to meet the needs of manufacturers of electrical and electronics appliances and equipment for a waterproof, vibration-dampening fastening has been made available. Of interest also to manufacturers of large and small appliances is a cushioning feature which protects porcelain and other highly-finished appliance surfaces. Called "NYLTITE STAPS," it consists of a self-conforming nylon washer preassembled to a standard P-K Self-tapping screw. The specially-designed Nyltite washer, made of DuPont "Zytel," compresses against head and threads of the fastener as the screw is turned in, completely sealing the opening against moisture penetration. Write Dept. MPM, Parker-Kalon, div. of General American Transportation Corp., Clifton, N.J.

## COMPACT TOGGLE SWITCH

A new, compact toggle switch measuring only .625″ x 1.750″ x .687″ high, designed primarily for home appliance and related applications, has been announced. The simplicity of design achieved by the company's research engineers now provides a dependable, quality switch at a lower cost according to the manufacturers. The new "TEP" Switch is now considerably smaller, offers the same variety of contacts, and is available in either single-pole — single-throw, single-pole — double-throw, double-pole — single-throw, or double-pole — double-throw types. It is rated 15 amperes at 125 and 250 volts A. C. only, and is Underwriter Laboratories tested and approved. Write Dept MPM, Tuttle Electric Products, Inc., Kirkland, Ill.

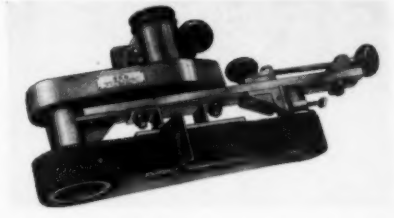



## INSTANT SPEED VARIATOR



A speed changer, called "RATEX," and using a self-compensating, floating pulley arrangement, permits the operator to change machine speeds instantly without stopping the motor, according to the manufacturer. Designed for use on drill presses, machine tools, power and feed controls, conveyors, timing and experimental devices, etc., the unit has a variable speed range of 6½ to 1 ratio with fingertip control. The speed changer fits any standard 2¾-inch drill press support post, and angle brackets for special installations in either horizontal or vertical positions are available from the manufacturer. Write Dept. MPM, The Custanite Corp., 1228 Utica Ave., Brooklyn 3, N. Y.

## CONTACT-WHEEL BELT GRINDER



The Model 400, having a 5-inch by 2-inch contact wheel and 2-inch by 48-inch abrasive belt, and the Model 300, having a 4-inch by 2-inch contact wheel and a 2-inch by 36-inch abrasive belt, have been announced. The belt grinders permit a 360-degree rotation of the contact wheel, allowing easy, instant adjustment to the working position of any operator, according to the manufacturer. The grinders may be mounted on a portable table, bench, pillar, etc., with only four bolts required. Write Dept. MPM, B & E Mfg. Co., Inc., Oak Grove, Mo.

## ANGLE ATTACHMENTS SIMPLIFY FASTENING

A new line of angle attachments, designed to simplify production fastening in close quarters and hard-to-reach places, has been announced. The four attachments, for use with the recently-developed line of Keller Tool air drivers, are heavy- or light-duty angle screw drivers and nut setters. Newly-designed Keller No. 2 air motors power both the 12G-2 series screw drivers and the 16G-2 series nut setters. The manufacturer states that the air motors provide more speed, increased power, low noise level, and low maintenance. Write Dept. MPM, Gardner-Denver Co., Quincy, Ill.

# The color uniformity of

# starts here!

The General Electric Recording Spectrophotometer used in Pemco's Laboratory minimizes for Pemco customers the problems of achieving perfect color uniformity in production. By measuring basic color and color stability characteristics with variations in firing treatment, reproducibility of the color can be anticipated in future production.

Pemco was the first frit manufacturer to install this type of modern precision equipment in its laboratory for the benefit of its customers. In daily use, it assures the uniformity of product so necessary in profitable enameling operations.

*"Pemco Service"— personal assistance, development assistance and finest performing materials —are available to you through the Pemco Engineer in your area.*

*Manufacturers of "the World's Finest" Glaze Frits, Coloring Oxides, Screening Pastes, Body and Glaze Stains, Porcelain Enamel Frits, Vitrifiable Glass Colors*

WORLD'S FINEST PEMCO

**corporation**

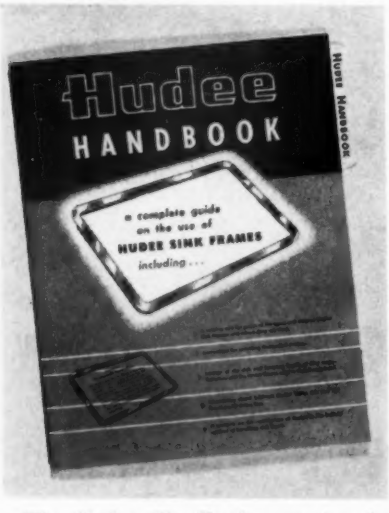
**BALTIMORE 24, MARYLAND**

# New Industrial Literature

## NEW SPRAY BOOTH CATALOG

Spray booths of every type, size, and application are featured in a single catalog. Included are full descriptions and specifications for custom design units and/or "ready-made" units, which can be erected with only a wrench and screwdriver for tools, as well as all information necessary to select the right type, size, and features of a spray booth. The introductory section, for instance, illustrates and describes water wash, paint arrestor, dry baffle, ceramic and traveling spray booths, and states conditions for which each is best adapted. This is followed by an illustrated Selector Guide, an innovation in spray catalogs, each with capsule descriptions of the booth, how it works and its primary uses. Each illustration is keyed to the page number and section in the succeeding pages where detailed information is available. Also, the catalog includes a special section detailing seven points to consider in selecting a spray booth. Write for catalog I-7000, Dept. MPM, The DeVilbiss Co., Toledo 1, Ohio.

## HUDEE HANDBOOK




The Hudee Handbook contains the complete up-to-date listings of the products of 50 manufacturers of sink bowls. The Handbook contains the catalog number and the list price of the types and sizes of Hudee frames and where they are used, instructions for installing, and the frame to be used with each bowl made by the manufacturers listed. The Hudee Handbook also has complete information about union bar and other valuable information to the trade. Write Dept. MPM, Walter E. Selck and Co., 225 W. Hubbard, Chicago, Illinois.

## PRE-PAINTED METAL

Coiled pre-coated metals are a comparatively new development in the metal industry. This folder contains a description of how metal is pre-coated and how it can be used. Various metals may be coated with either paint or vinyl materials. Dept. MPM, Roll Coater Inc., P. O. Box 67, Pendleton, Ind.

## INDUSTRIAL OVENS AND DRYERS

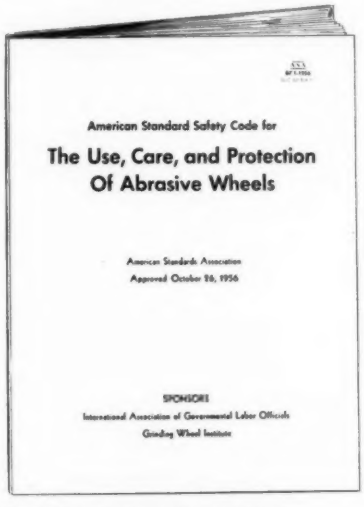
A 16-page booklet just issued illustrates and describes a complete line of industrial ovens of baking, drying, curing, and heat treating. For easy reference, the bulletin contains sections describing batch-type ovens, conveyor-type ovens, various air recirculating and heating systems available, and control and safety equipment. The many illustrations of recent installations in modern industrial plants are identified by descriptive captions listing the type of oven, and the process and product involved. Many illustrate unique methods of solving unsual problems. Some ovens pictured are notable as the largest of their type in use. Write for Bulletin 157, Dept. MPM, Young Brothers Company, 1831 Columbus Rd., Cleveland 13, Ohio.

## EXPANDERS — MECHANICALLY AND HYDRAULICALLY POWERED

This new bulletin gives construction details, specifications, and shows machine pictures. It describes the expanding principle and discusses expander selection, operation, and tooling. In addition, data on special types of expanders is presented. Included in the 10-page booklet is a glossary of expander terms, and photos of some recently-produced machines purchased by manufacturers making a wide range of parts from jet engine and missile components to washing machine tubs, compressed air tanks, and pipe couplings. Write on your company letterhead for bulletin 557, Dept. MPM, Grotnes Machine Works, Inc., 5454 N. Wolcott Avenue, Chicago 40, Illinois.

## ABRASIVE WHEEL SAFETY CODE

The American Standards Association has approved the revised edition of the 1947 Safety Code for the use, care, and protection of abrasive wheels. This revision was made under the sponsorship of two organizations: International Association of Governmental Labor Officials and the Grinding Wheel Institute. This new abrasive wheel safety code represents a major revision of its 1947 counterpart. For a copy write Dept. MPM, Grinding Wheel Institute, 2130 Keith Building, Cleveland 15, Ohio.


American Standard Safety Code for

**The Use, Care, and Protection Of Abrasive Wheels**

American Standards Association
Approved October 16, 1956

SPONSORS
International Association of Governmental Labor Officials
Grinding Wheel Institute

## CATALOG ON CONTAINERS

An illustrated catalog describing a complete line of shipping containers and the services offered by this company is offered. Included in the complete line are wirebound and hinged-corner pallet boxes and cleated, cleated-corrugated, wirebound, corrugated, and hinged-corner crates and boxes. Write Dept. MPM, Chicago Mill and Lumber Co., 33 S. Clark St., Chicago 3, Illinois.

## PRESS BRAKE BULLETIN

Just published, this bulletin introduces an all-new press brake that combines streamlined appearance with advanced power features. Featuring totally-enclosed construction, this press brake houses the entire drive inboard. Nothing protrudes to take up floor space or endanger safety. The one-piece frame with wrap-around crown provides maximum strength and rigidity. A 50 percent deeper throat is made possible by the incorporation of heavier, deeper uprights, Models available in 30 and 50 ton capacities with overall bed lengths of 6 to 12 feet. Write for Bulletin 90, Dept. MPM, Niagara Machine & Tool Works, 683 Northland Avenue, Buffalo 11, N. Y.


## AHLMA ELECTS TWO ASSOCIATE MEMBERS

Two new associate members have been elected to membership in the American Home Laundry Manufacturers' Association, Guenther Baumgart, executive director, announced. They are The O. Hommel Co., Pittsburgh, Pa., and Scovill Manufacturing Co., Chicago, Ill.

The O. Hommel Co., founded in 1891, is one of the oldest ceramic color manufacturers in the country. It also produces porcelain enamel frit, chemicals, bronze powders, and supplies for the appliance industry. T. E. Snyder, advertising and marketing development, will serve as the official representative to AHLMA.

The Scovill Manufacturing Co. supplies component parts to the appliance industry, and is currently engaged in the design, development, and production of electrical controls. The company also produces large tonnage brass and aluminum mill products for industry as well as household electrical appliances and a variety of metal consumer items. The company will be represented by F. R. Hodgkinson, manager, research and development sales.

## NSMPA THIRD NATIONAL SALES CONFERENCE

Its third national sales conference, scheduled for the Moraine Hotel, Highland Park, Illinois on August 5 and 6, has been announced by the National Screw Machine Products Association, Cleveland.

This year's conference will feature two innovations: first, the sessions will be presented largely by professionals from outside the industry, persons experienced in sales conference presentations; second, a special session is being planned for sales executives only, with salesmen meeting separately.

Subjects to be covered during the two-day meeting include "The Relationship of Industry and Geography to the Buying Habits of Purchasing Agents"; "Closing the Sale"; "Sales Training"; "The Problems of Sales Management"; "Practical Marketing Analysis"; and "Engineering Your Sales".

The conference is planned for Association members' personnel only.

## HONEYWELL BUYS RAYTHEON'S SHARE OF DATAMATIC CORP.

Minneapolis-Honeywell Regulator Company has purchased from Raytheon Manufacturing Company for $4,500,000 the latter's 40 per cent stock interest in Datamatic Corporation, it was announced jointly by Paul B. Wishart, president of Minneapolis-Honeywell, and Charles F. Adams, president of Raytheon.

Datamatic Corporation was organized jointly by Minneapolis-Honeywell and Raytheon in 1955 to engage in the development of large-capacity high-speed electronic digital data processing systems for office and business use.

## THREE NEW MEMBERS ACCEPTED BY GAMA

Three companies have been elected to membership in the Gas Appliance Manufacturers Association, according to an announcement by Harold Massey, managing director.

New members are Franklin Lumber & Fixture Co., Division of N. Wasserstrom & Sons, Inc. of 878 Michigan Avenue, Columbus, Ohio, manufacturer of dry-heated hot food tables for hotel, restaurant, and commercial use; Rosander Company of 311 Fifth Avenue North, Minneapolis, Minn., producer of gas commercial coffee makers, and Lucas-Rotax Ltd. of 2200 Eglinton Avenue East, Toronto, Canada, manufacturer of gas hot water heating boilers and warm air furnaces.

## NEW CHAIRMAN FOR DIVISION OF AMCA

W. Rutter, chief engineer, Burt Manufacturing Company, Akron, Ohio, has been named chairman of the Power Roof Ventilating Division of the Air Moving and Conditioning Association, Detroit. Mr. Rutter was formerly vice-chairman of the division.

## MASS SHIPMENT OF MITCHELL AIR CONDITIONERS COOLS CONGRESS


*A solid wall of cool comfort to help soothe congressional brows during recent heat wave is displayed on loading dock of George's Radio and TV appliance store in Washington, D. C. after rush shipment of 500 Mitchell room air conditioners were received. On sale 24 hours after order was placed, some units were sold off dock. Standing in front of approximately 100 of the units are (left to right) Millard Fleischer, sales manager of The Jos. M. Zamoiski Co., Washington Mitchell distributor; Mike Filderman, executive vice president of George's; and Joseph M. Zamoiski, executive vice president and general manager of the Zamoiski company.*

## METAL PRODUCTS STATISTICS

**a current report on available production, shipment and sales figures for important products in the appliance and fabricated metal products manufacturing field**

*GAS WATER HEATERS* — May shipments 238,600, 2.3 per cent below '56; first five months 1,126,500, 10.0 per cent below '56.

*GAS RANGES, BUILT-IN* — May shipments 15,200, 17.8 per cent gain over '56; first five months 70,900, 13.8 per cent gain over '56.

*GAS RANGES, FREE-STANDING* — May shipments 142,000, 14.9 per cent below '56; first five months 744,200, 11.6 per cent below '56.

*GAS FURNACES* — May shipments 52,900, 17.1 per cent below '56; first five months 248,700, 12.4 per cent below '56.

*GAS-FIRED BOILERS* — May shipments 6,600, 8.2 per cent gain over '56; first five months 28,800, 2.7 per cent below '56.

*GAS CONVERSION BURNERS* — May shipments 8,300, 30.8 per cent below '56; first five months 39,200, 16.8 per cent below '56.

*ELECTRIC REFRIGERATORS* — May shipments 303,700, 12.4 per cent below '56; first five months 1,498,700, 13.2 per cent below '56.

*ELECTRIC FREEZERS* — May shipments 82,300, 0.8 per cent below '56; first five months 376,400, 11.4 per cent below '56.

*ELECTRIC RANGES, BUILT-IN* — May shipments 30,400, 13.3 per cent below '56; first five months 177,800, 13.6 per cent gain over '56.

*ELECTRIC RANGES, FREE-STANDING* — May shipments 63,200, 32.2 per cent below '56; first five months 434,600, 27.2 per cent below '56.

*ELECTRIC WATER HEATERS* — May shipments 71,500, 10 per cent below '56; first five months 322,200, 17.7 per cent below '56.

*ELECTRIC DISHWASHERS* — May shipments 24,800, 41.0 per cent below '56; first five months 157,800, 18.3 per cent below '56.

*ELECTRIC FOOD WASTE DISPOSERS* — May shipments 35,900, 57.0 per cent below '56; first five months 211,500, 23.5 per cent below '56.

*COMBINATION WASHER-DRYER* — May factory sales 9,443, 25 per cent below April '57; no comparable '56 figures available.

*WASHERS, AUTOMATIC & SEMI-AUTOMATIC** — May factory sales 184,858, 16 per cent below '56; first five months 1,345,499, 20 per cent below '56.

*WASHERS, WRINGER & ALL OTHER* — May factory sales 69,337, 26 per cent below '56; first five months 499,080, 30 per cent below '56.

*ELECTRIC DRYERS* — May factory sales 20,715, 49 per cent below '56; first five months 403,448, 28 per cent below '56.

*GAS DRYERS* — May factory sales 10,857, 28 per cent below '56; first five months 144,601, 12 per cent below '56.

*IRONERS* — May factory sales 2,865, 32 per cent below '56; first five months 23,263, 24 per cent below '56.

*VACUUM CLEANERS* — May factory sales 231,246, 17.9 per cent below '56; first five months 1,403,244, 15.6 per cent below '56.

*METAL FURNITURE* — May shipments were 5 per cent above '56; first five months were 15 per cent below '56.

*TELEVISION* — April production 361,246, 34.2 per cent below '56; first four months 1,835,975, 23.3 per cent below '56.

*RADIO (Including automobile recievers)* — April production 1,115,813, first four months 5,075,180, 12.1 per cent gain over '56.

*COMPRESSOR BODIES* — Shipments for the three-month period totaled 1,392,854 compared with 1,344,393 in the first quarter of '56.

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Radio-Electronics-Television Manufacturers Association, and Air Conditioning and Refrigeration Institute.

*Note: During 1956, combination washer-dryers were reported once as an automatic washer and once as an electric or gas dryer. The 1957 per cent of change from 1956 on this basis is: Total Home Laundry Appliances down 16 per cent; Total Washers down 18 per cent; Automatic and Semi-Automatic Washers down 14 per cent; Total Dryers down 9 per cent.

## RHEEM PRODUCES MILLIONTH GAS-FIRED WATER HEATER

The "Magnificent Millionth" was the subject recently of congratulations by J. Theodore Wolfe, president of the Baltimore Gas and Electric Co., to Harry T. Halvorsen, resident manager of the Sparrows Point (Md.) plant of Rheem Mfg. Co. Present for the public christening of gas-fired water heater No. 1,000,000, manufactured at the Sparrows Point plant, and opening of the month-long exhibit at the Baltimore utility,

were (left to right) Rheem representatives Ed. H. Perry; Runo C. Anderson, region sales manager; William G. Watt, region sales promotion manager; and Vearl J. Heinis, vice president of the Rheem Home Products Division.

This production milestone applies only to the Sparrows Point plant, and is in addition to electric water heaters made there, and in addition to all water heaters produced in other Rheem plants.

## FIVE MORE FIRMS JOIN GAS APPLIANCE GROUP

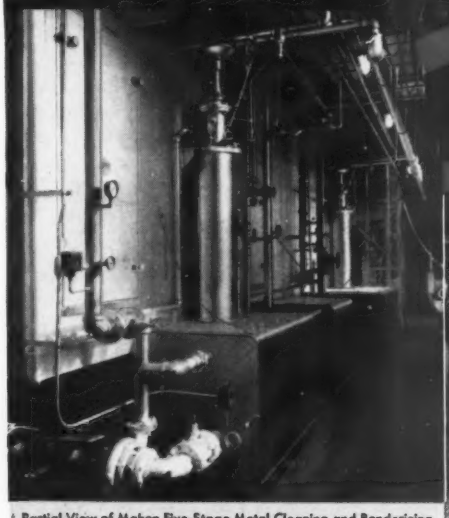
Five manufacturing companies — one with headquarters in Argentina — have become members of the Gas Appliance Manufacturers Association.

CATITA, S. A. of 3220 Zepita, Buenos Aires, manufactures automatic gas ranges, gas water heaters and gas heating units.

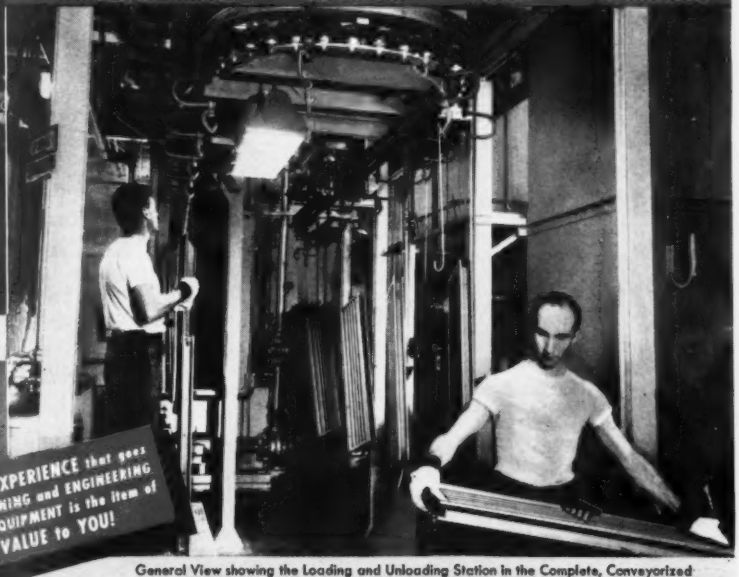
The newly elected domestic firms are: Oakland Foundry Co., of Florida and A Sts., Belleville, Ill., manufacturer of automatic gas ranges, direct heating equipment and gas incinerators; Nu-Way Corp., of 2416 4th Avenue, Rock Island, Ill., maker of gas conversion burners; American Air Filter Co's Herman Nelson Division, of 215 Central Avenue, Louisville, producer of gas furnaces, and National Heating & Cooling

# COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

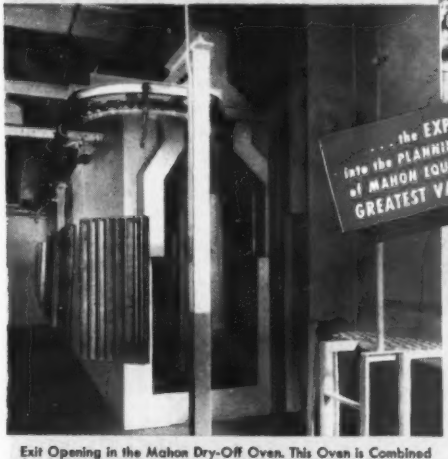


Partial View of Mahon Five-Stage Metal Cleaning and Bonderizing Machine in the Airolite System. Note Patented Fire-Jet Heaters.



. . . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

General View showing the Loading and Unloading Station in the Complete, Conveyorized Mahon Finishing System recently installed in the Airolite Company's Plant, Marietta, Ohio.



Exit Opening in the Mahon Dry-Off Oven. This Oven is Combined with the Paint Baking Oven and Built as One Direct Gas-Fired Unit.

In the view above you see an Oven Heating Unit and a Control Cabinet which Houses Temperature Recorder and Safety Devices. Ventilated Solvent Vapor Chamber appears at left.

## *High Quality, Durable Finish on AIROLITE LOUVERS is Produced in a COMPLETE, MODERN MAHON SYSTEM!*

The Airolite Company, Marietta, Ohio, manufacturers of high quality fixed and adjustable Louvers of all types, and numerous other metal products, have recently modernized production facilities which now include a complete, new Mahon Finishing System specially designed to accommodate all products presently in production as well as several items planned for the future. The new Mahon Finishing System in the Airolite plant includes a five-stage Metal Cleaning and Bonderizing Machine, Dry-Off Oven, Flow Coating Machine with a Ventilated Solvent Vapor Chamber, and a Paint Baking Oven . . . processing is continuous and automatic from conveyor loading to unloading. This is one of thousands of Mahon finishing systems that have been specially designed and installed in each case to meet the specific requirements of the manufacturer. If you have a finishing problem, or are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment to produce the finest finish at minimum cost. See Sweet's Plant Engineering File for information, or write for Catalog A-657.

**THE R. C. MAHON COMPANY • Detroit 34, Michigan**

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems — including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

# MAHON

Manufacturing Corp., of 305 N. Front Street, Columbus, Ohio, manufacturer of gas boilers, furnaces and water heaters.

The companies' delegates and alternates to divisional meetings and general convention sessions of the association will be Alfredo B. Gatti and Jose Muro Nadal, for CATITA: King Ehret, president, and G. Smallwood, engineer, for Oakland Foundry; Don C. Hubbart, engineer, for Nu-Way; C. Stock, manager of unit ventilator products department, and Frank Stanton, for American Air Filter, and W. H. DeLancey, director of engineering, and Ray Harnetiaux, director of sales, for National Heating.

## DRYER IS APPLIANCE PROFIT STAR

Judson S. Sayre, president of Norge, said at the summer home furnishings market that the dryer will set another record year, reaching 1,800,000 unit sales.

"Still, 85 per cent of the potential dryer market will remain unsold," he stated.

"By the end of next year more than 9,000,000 dryers will have been sold since the appliance came on the market.

"The dryer's importance as a growth appliance looms larger every day in our industry, which is currently beset by the woes of over-production and price-cutting. Almost because of the dryer's appeal as a work-saver to the housewife alone, we can expect that industry volume this year will equal that of 1956.

## MAYTAG'S PAYNE HONORED

An award for "appreciating and understanding the role of independent appliance servicemen and their business needs" was presented to the Maytag Company and S. R. Payne, general service manager, at the recent annual convention of the Appliance Parts Jobbers association at Miami Beach, Fla.

## STANDARD PRESSED STEEL COMPANY TO ENTER OFFICE FURNITURE FIELD

Columbia Steel Equipment Co., Inc. of Fort Washington, Pa., has been purchased by Standard Pressed Steel Co. of Jenkintown, Pa.

John F. Emhardt, president of Columbia, and H. Thomas Hallowell, Jr., president of Standard, announced jointly that all of the stock of Columbia will be exchanged for 78,181 SPS shares. They also stated that no changes are contemplated in the management, personnel or sales policies of either company.

Columbia, in the office furniture field for 38 years, recently moved into a 100,000 square foot ultra-modern plant, which was the first in the new Fort Washington Industrial Tract. Located at the Pennsylvania Turnpike interchange, this area has attracted nationally important companies.

In addition to President Emhardt, other key officers of Columbia Steel Equipment Co. are Herman K. Gessner, vice president and treasurer, and Rudolph Moosbrugger, secretary.

## WORCESTER PRESSED STEEL OPENS NOMINATIONS FOR 1957 AWARD

Nominations are now being considered for the 1957 annual Presteel Award, Carter C. Higgins, president and general manager of the Worcester Pressed Steel Company, Worcester, Mass., told the Pressed Metal Institute Directors Meeting in Worcester.

The award was established in 1954 to honor the individual or company selected as having made significant contributions to the advancement of the metal stamping industry. Previous year's winners included Mr. Del Harder, executive vice president of Ford Motor Company's Basic Manufacturing Division, the American Iron and Steel Institute, and Mr. Stanley R. Cope, president of

the Acme School of Die Design Engineering, South Bend, Indiana.

Criteria for selecting the winning nomination will be: 1) notable advances in developing and marketing products using stampings; 2) contribution in original research, or cost saving, or technical improvements made available to the industry; 3) public education activities; 4) company growth trends, when applicable; 5) participation in formal education, training of new engineers, etc.; 6) other accomplishments stimulating wider use of stampings.

Nominations for the award will be welcomed from all of industry and should be addressed to the Worcester Pressed Steel Company, 100 Barber Avenue, Worcester 6, Mass.

## METAL FURNITURE COMPANIES COMBINE OPERATIONS

The Brown-Jordan Company, Pasadena, Calif., and the Varazini Furniture Co., Newport, Ark., both metal furniture manufacturers have combined their operations in a two-corporation merger based on a 50/50 exchange of stock.

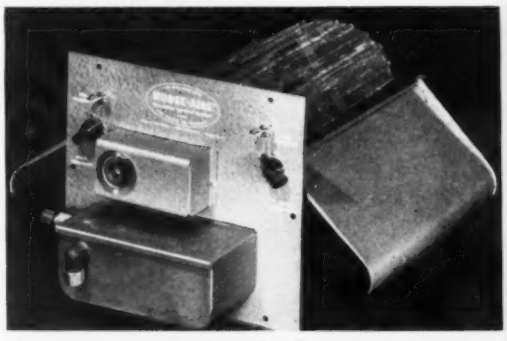
The California firm will continue as the Brown-Jordan Co., Pasadena, and the Arkansas operation becomes the Brown-Jordan Corp., Varazini Division, Newport.

Victor Muscat, who headed Varazini as president of the parent company, Victor Metal Products Corp., becomes chairman of the board of the merged operation. Robert E. Brown becomes president of both furniture companies, in charge of plant operations and production, and Hubert W. Jordan is vice president and director of sales and policies.

## A HUMIDITY CONTROL SYSTEM FOR WARM AIR FURNACES

Walter E. Selck & Company, Chicago, Illinois, has developed a new type humidifier to be installed in the plenum of forced air furnaces for proper humidity control.

The unit has been given the name "Hudee'Aire Humidity Control System." Humidity control has long been a real problem but the Selck Company feels that the answer to supplying controlled humidity conditions has been found.



A screen cylinder, made of non-corroding phosphorus bronze, rotates as it is driven by a small cynchron motor. Water is lifted by the screen cylinder from the pan below. As the furnace blower fan goes on, a water wheel rotates. Vaporization takes place as air currents pass through the screen cylinder.

Installation of the unit is said to be simple. For additional details contact Walter E. Selck, 225 West Hubbard St., Chicago 10, Illinois.

## WASTE KING NET EARNINGS UP 50% FOR FISCAL YEAR

Net earnings of $239,725 for the fiscal year ended March 31, 1957, an increase of approximately 50 per cent from the previous year's $159,239, were announced by Waste King Corp., Los Angeles.

Bertram F. Given, executive vice president, reported net sales rose 31 per cent to $15,400,516 from the previous year's $11,740,923.

Waste King, manufacturer of food waste disposers for commercial and household use, added a new dishwasher to its appliance line during the year. The firm also makes built-in kitchen cooking equipment and household incinerators.

## NEW CANADIAN COMPANY FOR MARY PROCTOR PRODUCTS

A new company, Proctor Electric Canada, Ltd., was announced in July as the latest development in the expan-

*to Page 98* →

# Gives Your Product Sales Appeal

Republic ENDURO Stainless Steel is an unmistakable sign of quality in appliances, housewares and flatware. A quality that sets your product off from the commonplace. Quality that changes *eyers* to buyers. Quality that gives your product sales appeal in the market place.

There is no reason why your product shouldn't have this sales advantage now. Fabricate ENDURO on your present equipment, with little or no change in procedure. Bend it, draw it, stamp it, spin it, roll-form it, weld it, solder it, emboss it, etch it—without difficulty.

ENDURO is solid stainless all the way through. There's no surface to wear away. No danger of flaking, peeling, chipping or cracking. No need for expensive plating, lacquering, or electrochemical treatments, to enhance ENDURO's outstanding corrosion-resistance or lustrous beauty.

Use ENDURO in appliances to obtain freedom of design. Its extremely high strength-to-weight ratio permits use of thinner, lighter sections to span large areas in an unbroken sweep. Use ENDURO for brightwork. It has the strength to withstand the abuse of everyday use. Use ENDURO for functional parts. Its strength, heat-resistance and corrosion-resistance make it the perfect metal for any application involving heat and cold. Use ENDURO to give your product sales appeal.

Republic metallurgists and engineers will assist you in selection, application, and processing of ENDURO Stainless Steel. No obligation, of course. Just mail the coupon.

## MORE REPUBLIC PRODUCTS FOR SALES APPEAL

**REPUBLIC ELECTRO PAINTLOK** is used for the exterior panels or cabinets of ranges, refrigerators, freezers, dryers, washers, air-conditioners, etc. It provides an excellent paint-adhering surface—even after severe forming operations. Electro Paintlok is produced by electro galvanizing and a chemical treatment process. Sheets are shipped from the mill in prime condition for painting. Sometimes cleaning and priming may be eliminated. Only the final finish need be applied for full protection and attractive appearance. Send coupon for full details.

**REPUBLIC CONTINUOUS GALVANIZED** steel sheets solve a variety of problems for manufacturers seeking inexpensive, long-lasting corrosion protection. Continuous galvanized sheets are often used for liners in freezers, coolers and dispensers. The uniform, tight zinc coating won't crack, peel or flake off under the most rugged fabrication. Excellent ductility assures easy workability, yet the sheet is sufficiently rigid to withstand severe use. Completed products are positively protected without the expense of individual hot dip galvanizing after forming. Write for facts.

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**Cleveland 27, Ohio**

☐ Have a Stainless Steel Metallurgist call.

Send more information on:

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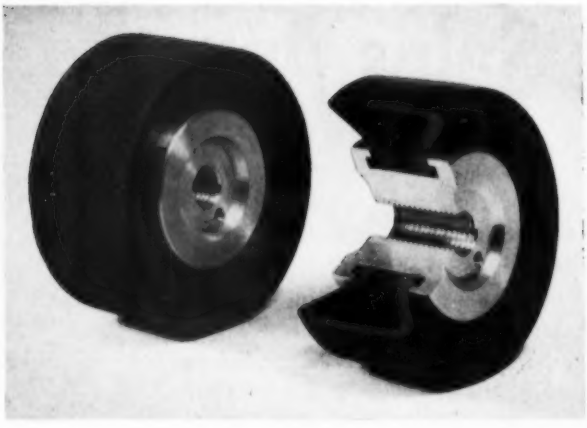
☐ Electro Paintlok® Sheets
☐ Continuous Galvanized Sheets

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____



## NU-MATIC announces new principal in inflated grinding wheels

The new "Aircore" design consists of only TWO parts . . . the drum and the core. And, it is SELF SEALING . . . as the hollow rubber drum is inflated it automatically makes positive, leak-proof contact with the metal core.

Check these PLUS features

PRECISION OPERATION. Wheel always runs true because rubber drum seats on accurately machined core. Vibration-free operation.

FEWER PARTS TO STOCK AND MAINTAIN. No nuts, bolts or sideplates.

TROUBLE-FREE CORE. Made of machined aluminum. Can't break, crack or leak. Will last a lifetime.

Three models are available: 3" diameter x 2" width, 4" diameter x 2" width, 5" diameter x 3½" width.

WRITE FOR COMPLETE SPECIFICATIONS. Also, ask about Nu-Matic's new "Flexcore" . . . an expanding-type grinding wheel with replaceable rubber segments.

**NU-MATIC GRINDERS, INC.**
**8224 CARNEGIE AVE. CLEVELAND 3, OHIO**

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**Appliances move easier on**

**NAGEL-CHASE CASTERS**

For dependable, easy, free movement, equip your appliances with free swiveling, sturdy Nagel-Chase Casters, the standard with the leading appliance manufacturers.

Refer any problem of mobility to Nagel-Chase, specialists in production casters.

*Write for catalog today!*

**The NAGEL-CHASE MANUFACTURING CO.**
**2817 North Ashland Avenue, Chicago 13, Ill.**
*Manufacturers of Nagel-Chase Casters and V-Belt Pulleys*

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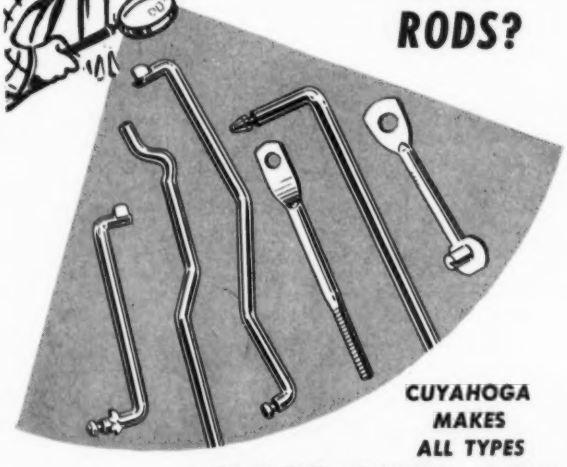
**LOOKING FOR LINKAGE RODS?**



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# The MPM camera in Nashville

A RECENT trip to Nashville, Tennessee took our cameraman into the Temco, Inc. plant, where home heating equipment and ranges are produced—to a fibreglass manufacturing plant — and to the frit manufacturing facilities of Ferro Corp., where the company was celebrating its 10th Anniversary in Nashville. The celebration, which was attended by the governor of Tennessee and other dignitaries, included a plant tour, an outdoor luncheon, and other festivities. Here are just a few photos recording the Nashville visit. Appliance plant features will follow in later issues.

*Above: In the Ferro frit plant at Nashville are shown from left to right: F. D. Hart and R. N. Smith, Temco, Inc.; and C. D. Clawson and William N. Noble, Ferro Corp.*

*Right: One of the welding operations in the Temco, Inc. plant at Nashville. This welding station is served by continuous overhead conveyors. You will read more about this plant in a later issue of* MPM.

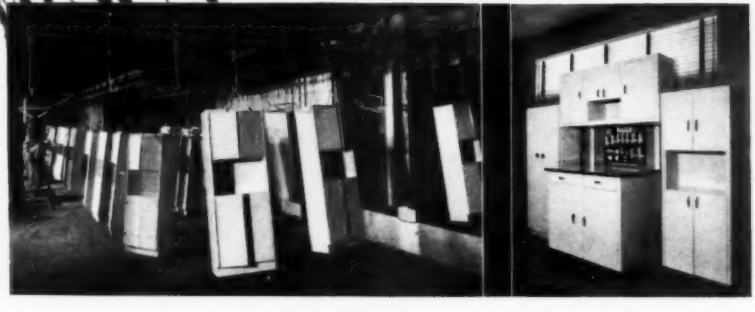
*Frank G. Clement, governor of Tennessee, has just made C. D. Clawson, Ferro president, and William N. Noble, frit division manager, honorary citizens of Tennessee.*

*These executives of Phillips & Buttorff Mfg. Co. are (l. to r.): W. R. Lawrence, president; Paul Clements, contract administrator, and Horace Sprott, v.p., manufacturing.*

THE INCAS WERE CRAFTSMEN

. . . THEY STILL ARE

**Inca Cabinets**



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The problem? An enamel coating to meet Inca's high standards of craftsmanship while keeping unit cost in the competitive price range of a highly cost-conscious industry.

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*United—through five strategically located plants that include the finest research facilities in the industry—is ready to solve your special paint and finish problems. May we send one of our engineers for consultation?—without obligation, of course. We'd like to meet you—perhaps to serve you.*

**FIVE STRATEGICALLY LOCATED PLANTS**

EAST
*Benjamin Franklin Paint & Varnish Co.*
*Philadelphia, Pa.*

SOUTHEAST
*Carolina Paint & Varnish Works*
*Greensboro, N.C.*

CENTRAL
*Illinois Paint Works*
*Chicago, Ill.*

WEST
*Pacific Paint & Varnish Co.*
*Berkeley, Calif.*

SOUTHWEST
*De Soto Paint & Varnish Co.*
*Garland, Texas*

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## INDUSTRY PERSONALS

The general purchasing staff of Rheem Mfg. Co. has effected promotions for two of the company's key men, it was announced by George J. Papas, director of purchasing.

*Will H. Roy* has been appointed to the newly-created position of administrator of inventory management control. Previously, Roy was a general staff purchasing agent.

*Kenneth H. Riha,* formerly division purchasing agent of the Rheem Container Division, was advanced to the position of assistant to the director of purchasing.

*W. B. Creech,* formerly manager of major accounts, has been named manager of the newly-created Westinghouse appliance service division.

John W. Craig, Westinghouse vice president and general manager of the Electric Appliance Divisions, announced Mr. Creech's appointment and creation of the division concurrently.

*Fred L. Plummer,* Warren, Pennsylvania, has been appointed National Secretary of the American Welding Society. He will assume his new duties immediately and will maintain his office at the Society's National Headquarters. The appointment was made to fill the vacancy created by the resignation of Joseph G. Magrath who served as secretary for many years.

CREECH

PLUMMER

The appointment of *Kenneth F. Middaugh* as plant manager in charge of weld operations of Sylvania Electric Products Inc. has been announced by Merle W. Kremer, general manager of the company's Parts Division.

In his new assignment, Mr. Middaugh, who previously was purchasing agent for the Parts Division, will be responsible for manufacturing operations at Sylvania's weld plants in Warren, Pa., and in Nelsonville, Ohio. He will continue to have his office at division headquarters in Warren.

The appointment of *George Konkol* to the newly created position of manufacturing manager in charge of wire, weld, and metal stamping operations at the Warren, Pa.; Nelsonville, O., and York, Pa. plants has been announced by Merle W. Kremer, general manager of the company's Parts Division.

*Meredith L. Addy* was named purchasing agent for John Wood Company, Heater & Tank Division. He will be responsible for all purchases necessary for operation of the Division's principal plant and offices in Conshohocken, Pennsylvania, according to J. H. Gotwals, Vice President and General Manager, Heater & Tank Division.

*Bertram F. Given* has been elected president of Waste King Corporation, Los Angeles. Given was formerly executive vice president. He succeeds his father, Samuel Given, who previously served as both president and chairman of the board. The elder Given will continue as board chairman.

ADDY

GIVEN

Two promotions at the Scranton plant of The Trane Company, a major manufacturer of air conditioning and heating equipment, have been announced by Trane Vice President Miles Erickson.

*Gregory B. Littell, Jr.,* has been appointed superintendent, succeeding Richard Schiewetz, and *Alexander S. Hair* has been named general foreman. Schiewetz will head up Trane's new Southern plant at Clarksville, Tennessee.

*Jack J. Bacsik,* a veteran of 20 years in the air conditioning and refrigeration field, has been named service manager for Acme Industries, Inc., Jackson, Mich., manufacturers of equipment for residential, commercial, and industrial cooling.

*George Eichelsbach, Jr.,* for seven years manufacturing vice president of Magic Chef, St. Louis, has been appointed vice president manufacturing, of McCulloch Motors Corp., Los Angeles. McCulloch manufacturers chain saws, aircraft products and automotive superchargers.

The Pfaudler Co. of Rochester, New York, has announced the appointments of *George Warren* as ceramist assistant to the works manager and *Dr. David K. Priest* as administrator to the Ceramic Development Group and the Physical Testing Laboratory. Pfaudler is a large producer of glassed steel process equipment.

*John R. Kauffman* has been named executive vice president of Miller & Carrell Mfg. Co., Denver, Colo. He has bought an interest in that company, which manufactures commercial restaurant cooking equipment sold under the trade name "Speedster." The company is planning to reorganize, changing its name to "Speedster, Inc.," and will broaden its facilities to produce electrical heating units and other industrial and commercial devices.

WARREN

KAUFFMAN

Herman F. Lehman, General Motors vice president and head of Frigidaire division, Dayton, Ohio, has announced three executives changes in the sales and engineering departments.

*F. H. McCormick,* assistant chief engineer in charge of non-refrigerated products, and a pioneer in the development of electric ranges, laundry equipment, dishwashers, and water heaters, will retire Sept. 1.

*H. E. Van Scoyk,* assistant chief engineer in charge of air conditioning and commercial products, will succeed McCormick.

*William H. Anderson,* Frigidaire's appliance sales manager, has been appointed assistant general sales manager in charge of the Southern region.

James G. Koontz, general sales managers for Easy Laundry Appliances, Chicago, has announced the appointment of three division sales managers who will have over-all responsibility for Easy's sales in the Western, Central, and Southern territories.

Appointed Western division sales manager is *D. A. Sjolseth,* San Francisco, formerly Western regional sales manager.

Southern division sales manager is

*J. M. Hudson,* Atlanta, who for the past five years has been zone manager for the Southern region for Crosley-Bendix.

Central division sales manager is *E. W. Hubert,* Chicago, who was formerly assistant merchandising manager for Crosley-Bendix and, previous to that, was Mid-west zone manager for Crosley-Bendix.

*Richard Braun* has been named director of salaried personnel at the Maytag company in Newton, according to an announcement by E. F. Scoutten, vice president, personnel, at the appliance manufacturing firm. Braun replaces C. C. Hansen, resigned.

Election of *Rollo Asmussen,* general manager of the Clary Corporation's new Searcy, Ark., Division, as a vice president was announced by Hugh L. Clary, president, following action of the board of directors.

*James G. Koontz* has been promoted to the position of general sales manager of Easy Laundry Appliances, Chicago. The appointment was announced by Parker H. Ericksen, vice president of The Murray Corporation of America and The Easy Laundry Appliances division.

*Avery Wilson* has been promoted to buyer of production materials in the purchasing department of the Maytag Company in Newton, Iowa.

KOONTZ

WILSON

*H. C. "Pat" Patterson* has announced his retirement as manager of Kelvinator's commercial division, effective July 31.

Patterson has been in charge of Kelvinator's commercial division since 1946 and he has been with the company for the past 20 years.

*C. R. Rigby,* former manager of the A. O. Smith Corporation's Houston, Texas Works, has joined the company's central manufacturing staff in Milwaukee, reporting to vice president of manufacturing, Fred Mackey.

*Robert E. Lake,* manager, research and development, Whirlpool Corp., has been promoted to director of technical services for the International Division with headquarters in St. Joseph, Mich., it was announced by Robert M. Mitchell, vice president.

Lake joined Whirlpool in 1940 as a design engineer.

## SUPPLIER PERSONALS

*James A. Roemer,* President of Mallory-Sharon Titanium Corporation, has been elected President of Reactive Metals, Inc. Reactive Metals, formed a short time ago by Mallory-Sharon Titanium Corporation and U.S.I. Division of National Distillers and Chemical Corporation, produces ingots and mill products from zirconium, hafnium, and other reactive metals.

*John P. Edwards* has been appointed sales manager — Hetron polyesters in the Durez Plastics Division of Hooker Electrochemical Co., North Tonawanda, N. Y., according to an announcement by Alfred W. Hammer, Jr., general sales manager of the division.

*Raymond E. Mattocks* has been appointed manager of industrial engineering, Western Brass Mills division, Olin Mathieson Chemical Corporation, J. E. Williams, vice president and general manager of the division, announced.

Mr. Mattocks, who will be located in East Alton, Ill., has had ten years experience as an industrial engineer. He spent a year with the Sharon Steel Company, five years with the National Tube Division of the U. S. Steel Corp., and four years with the F. J. Kress Box Company, where he was chief industrial engineer.

*Dr. Walter A. Dean* has been named assistant development metallurgist for Aluminum Company of America, the company announced.

The promotion moves Dr. Dean from his position as chief metallurgist for Alcoa's Cleveland works to company headquarters in Pittsburgh. *Thomas R. Gauthier* succeeds Dr. Dean at Cleveland.

*R. K. Hoffman,* manager of the Engineered Products Division of Acme Precision Products, Inc., Dayton, has been named a vice president of the company.

DEAN

HOFFMAN

Appointment of *Leon Hurwitz* as product manager of the Metals Processing Department has been announced by the Hamilton Watch Company. Hurwitz, who has been with Hamilton for 10 years, was formerly chief metallurgist and in charge of the company's science laboratories. Before coming to Hamilton he was associated with Jones & Laughlin Steel Corporation in various technical capacities. The Metals Processing Department performs metals research and processing services for more than 200 companies throughout the country.

Henry Roemer, chairman of the board of Sharon Steel Corp., announced recently the appointment of *Frank W. Knecht, Jr.* to the position of vice president of the Sharon Steel Corp. and general manager of the Brainard Division, Warren, Ohio.

*Roy Dahlstrom* has been appointed director of research of National Lead Co. In his new capacity, Dahlstrom will supervise and coordinate the activities of all the company's laboratories.

Dahlstrom was formerly director of research for the titanium division where he has been active in the development of manufacturing processes and uses for titanium pigments, and in the processing of titanium metal. He is also reported to have done considerable work on metal-organic compounds and single crystal growth.

*Robert M. Briney* has been appointed president of Haynes Stellite Company, Division of Union Carbide Corporation, it was announced today by Morse G. Dial, president of Union Carbide.

Mr. Briney started with the Corporation in 1924 in the Niagara Falls, N. Y., plant of Electro Metallurgical Company, a division of Union Carbide. He has

held key positions with that division both in production and development at Niagara, as well as at Alloy, W. Va., and New York. In 1950, he was made vice-president in charge of wrought alloy products for Haynes Stellite Company in Kokomo, Ind., and was transferred to the New York office of that division in July, 1954.

Appointment of *Robert W. Saxton* as Assistant General Sales Manager has been announced by S. J. Stowell, General Sales Manager, Tranter Manufacturing, Inc.

In addition to the supervisory responsibility for all administrative aspects of the Sales Department, Saxton will assume the responsibility for liaison between sales and other operating departments of the company.

*Andrew L. Pontius* has been elected a *vice president* of *Illinois Tool Works* by the Company's board of directors according to an announcement by Harold Byron Smith, president. Mr. Pontius will continue in his capacity as *general manager* of the Company's *Shakeproof* Division, with executive offices in Elgin, Illinois.

Pontius joined Illinois Tool Works in 1952. He has served in various executive capacities in the Company's Shakeproof (in Elgin) and Fastex (in Des Plaines) Divisions and was made general manager of the Shakeproof Division early in 1955.

SAXTON

PONTIUS

*Dr. Claude A. Lucchesi* has been named director of the analytical research department of the Sherwin Williams Co. at Chicago. Announcement of his appointment was made by A. B. Holton, technical director of the paint firm. The new research department is an outgrowth of the analytical section of the company's Chicago paint research department which is under the direction of Maurice Van Loo.

*John L. Collyer*, chairman and chief executive officer of The B. F. Goodrich Company, has announced the retirement on July 31, 1957, of *William S. Richardson*, president, and the election of *J. W. Keener*, now executive vice president, as president, director and member of the executive committee, effective August 1, 1957. Mr Collyer said that Mr. Richardson would continue as a director of the company.

*Mort Sennett* has been named sales manager of Universal Screw Co., Evanston, Ill., manufacturers of screws and fasteners, according to an announcement by Arnold Meyer, president.

In February, 1956 Sennett joined Universal Screw Co. in a sales capacity and acted as special factory representative for field service. He was made marketing manager late in 1956 and has been handling sales promotion and customer relations. He will continue these duties in his new capacity as sales manager.

*Glenford M. Shibley* has been named manager of territorial sales of The Patterson Foundry and Machine Co., a subsidiary of Ferro Corp. He had been assistant to the director of sales since joining the company in January of this year. This new position was created to integrate even more closely field activities with home office sales operations.

SENNETT

SHIBLEY

*Gibson B. Mead* has joined the sales engineering staff of the Camden, N.J. office of Fulton Sylphon Division, Robertshaw-Fulton Controls Co., it was announced by G. L. Ogdin, Jr., general sales manager of the division. The Camden offices are located at 22 Haddon Ave.

*Lloyd Merwin, Sr.* has been elected a vice president of Crown Zellerbach Corp., and appointed general manager for converted products made by the Gaylord Container Corporation Division.

Merwin, who has been with Gaylord for 22 years, will return to St. Louis from Houston to assume responsibility for this newly-created post which is described by E. J. Spiegel, Crown Zellerbach's senior vice president, as a part of Gaylord's expansion program.

The appointment of *S. S. Wilson* as Executive Vice President and General Sales Manager has been announced by Sel-Rex Corporation, Nutley, New Jersey.

Wilson was formerly Vice President in charge of Sel-Rex's Detroit office, and was responsible for all midwestern operations for the past three years. Prior to joining the company in 1949, he had been with Koppers Chemical Company for six years, in executive positions in both sales and production, and three years with Sennett Steel Corporation in a supervisory sales capacity.

*Bernard S. Reckseit* has been named vice-president in charge of Engineering by Ransohoff, Inc., Hamilton, Ohio, one of America's oldest manufacturers of metal cleaning and finishing equipment and systems.

WILSON

RECKSEIT

The appointment of *Carl W. Polonus* as Manager of the Milwaukee District Sales Office of Sharon Steel Corporation was announced by W. J. McCune, General Manager of Sales.

*Wendell W. Wright* has been appointed industrial relations manager for the Aluminum division, Olin Mathieson Chemical Corporation. Mr. Wright had been industrial relations superintendent of the company's aluminum fabrication plant now being built near Clarington, Ohio.

*Charles L. Schmidt* has been appointed technical director of the Titanium Division of National Lead Company.

Schmidt has been assistant technical director of the division since 1953 and has, for a number of years, been associated with process development in the titanium pigment field.

Appointment of *A. E. Knox* to the new post of national sales manager of Central Scientific Co., Chicago, manufacturers of scientific instruments and laboratory apparatus, has been announced.

# NEWS about Suppliers

## UNIVERSAL RACK COMPANY BRINGS RACK SERVICE TO THE SOUTH

Announcement was made of the opening of a new plant by Universal Rack Co., Inc., in Lebanon, Tenn. This manufacturing operation has been established to supply all types of engineered racks and fixtures to the plating, organic finishing, and material handling industries, the report states.

SCOTT

TENPENNY

Duke Tyler Scott, general manager, spent the past four years at the General Electric Co. in Appliance Park, Louisville, Ky. as plating process planner in their Home Laundry department. He has also held the position of quality control analyst with the Colgate Palmolive Co.

To handle the sales for this new firm, Harry Tenpenny has been appointed sales engineer.

## NEW PORTLAND PLANT FOR PRECISION CASTPARTS

Completion of a new $125,000 investment casting and shell molding plant has been announced by E. H. Cooley, general manager of Precision Castparts Corp.

The new plant, on a three and one-half acre tract at 4600 S. E. Harney Drive, Portland, Ore., began operating recently. The building, covering 21,000 square feet of floor space, was specially designed as an investment casting and shell molding foundry, the report states. It will house the firm's offices, engineering department, tool and die shop, and metallurgical laboratory, as well as complete quality control and production facilities.

Precision Castparts Corp. specializes in the production of alloy and stainless steel parts required in aircraft, missile, and electronic manufacture.

## TEN SAFETY AWARDS TO PITTSBURGH PLATE GLASS

Ten Pittsburgh Plate Glass Company industrial operations and two plants of Columbia-Southern Chemical Corporation, its wholly-owned subsidiary, received National Safety Council awards for outstanding safety performances during 1956, T. R. Donoghue, manager of safety and plant protection, announced. Nine plants posted accident-free records.

## ACME STEEL DECLARES 313TH CONSECUTIVE DIVIDEND

The Board of Directors of Acme Steel Company, Chicago, declared a regular quarterly dividend of 50 cents per share on the 2,386,648 outstanding shares, payable August 3, 1957 to all shareholders of record on July 12, 1957. This is the 313th consecutive dividend payment made to Acme Steel shareholders since 1901.

## TWO NEW PLANTS FOR ASSOCIATED SPRING

Associated Spring Corporation, Bristol, Conn., will establish two new precision mechanical spring manufacturing plants — one in Montreal, in the Pointe Claire industrial district 13 miles southwest of the city, and the other in Puerto Rico, in or near San Juan — Carlyle F. Barnes, president, announced recently. The two expansion projects were approved by the Corporation's board of directors.

## INLAND STEEL TO EXPAND

The board of directors of Inland Steel Company has approved new financing in connection with the company's expansion program.

The company's $280,000,000 program of capital expenditures contemplates an increase in steelmaking capacity of 15 per cent by the end of 1958, new steel finishing facilities, an expanded ore supply, a new office building and expansion and improvements at plants of subsidiaries.

Joseph L. Block, president, stated that the company is roughly at the mid-point of this program. The increase in capacity, he said, was needed to meet the steel requirements of a rapidly growing population with ever-increasing per capita use of the metal. Inland's steel production has been at better than rated

## GROUND BREAKING FOR ROBERTSHAW-FULTON RESEARCH CENTER

*Officials of Robertshaw-Fulton Controls Company gather with community leaders to break ground for new $250,000 Western Research Center at Anaheim, Calif. From left: Thomas H. Jeffers, general manager, Western Research Center; Robert L. Wehrli, vice president and general manager, Aeronautical Division, at Anaheim; Wilbur F. Jackson, vice president and general manager, Grayson Controls Division, Long Beach; Fred Kreim, Aanaheim Chamber of Commerce; Charles A. Pearson, Mayor of Anaheim, and Oscar Schultz, president of Anaheim Chamber of Commerce.*

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*are available to you in . . .*

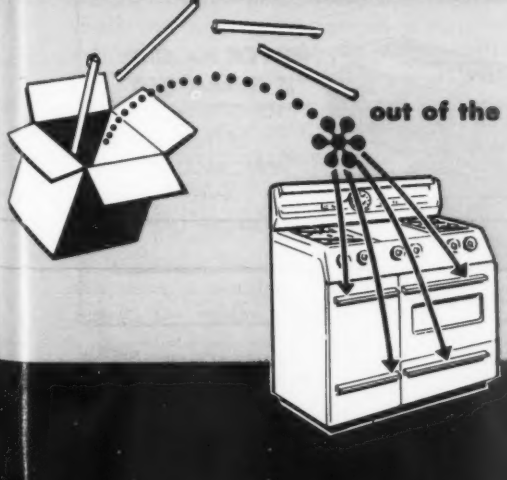

## 7 STANDARD MODELS

**IN THE MILLS LINE YOU HAVE A SELECTION OF DISTINCTIVE DESIGNS AVAILABLE IMMEDIATELY AT STANDARD PRODUCTION PRICES . . .**

PERMA-GRIP handles are produced by Mills Products, Incorporated, manufacturer of the now universally accepted PERMA-VIEW oven door window.

You can now purchase your appliance handles built to Mills' quality standards. Seven standard models are offered and four standard patterns are available on any model handle. All handles have plastic spacers which serve as a thermo-break. If you wish, consult with our engineering department regarding special custom requirements.

We have the skilled personnel, the specialized equipment, and we use the right materials to assure a reliable source for quality PERMA-GRIP handles. Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on PERMA-GRIP handles.



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*THE WINDOW YOU CAN SEE THROUGH ALWAYS*

# MILLS PRODUCTS INCORPORATED

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capacity all year and Block indicated that current order volume is maintaining full operations.

## WINNERS — STUDENT CONTEST IN PORCELAIN ENAMELING

Ferro Corp., Cleveland, Ohio recently awarded four prizes for papers submited in its Annual Student Contest in Porcelain Enameling. First, second and fourth prizes went to students of Georgia Institute of Technology, and third prize went to a student from the University of Illinois as follows: First Prize Winner — Henry Pierce Still, Jr.; Second Prize Winner — Edward Lee Bradley; Third Prize Winner — Donald R. Beebe; and Fourth Prize Winner — James F. Benzel.

The winning papers dealt with technical phases of porcelain enameling operations. It was the company's eighth annual competition.

Shown in the photograph (left to right) are Dr. Lane Mitchell, Director, School of Ceramic Engineering, Georgia Institute of Technology; Henry Pierce Still, Jr., first prize winner; Donald R. Beebe, third prize winner, and Dr. A. I. Andrews, head of the Department of Ceramic Engineering at the University of Illinois.

The judges in the Ferro Student Contest were C. S. Pearce, general secretary, The American Ceramic Society; John C. Oliver, managing director, Porcelain Enamel Institute, Inc.; and B. J. Sweo, director of research, Ferro Corp.

## SELCK SALES STAFF MEETS IN CHICAGO BEFORE SUMMER MARKET

*Seated at table, during recent sales staff meeting, are from left: James Butler, sales manager; Konrad Lopina, tile salesman; David J. Broderick, vice president; Claud Potts, general sales manager, Holcomb & Hoke; Dave Straub, sales manager, Vinyl Plastics, Inc., Sheboygan, Wis. Standing, from left, are: Hal Attaway, Wisconsin; Richard Travin, Illinois; Edward Kein, Chicago; Howard Holtz, assistant sales manager; Richard Ziebell, Chicago; Pat Heaton, Iowa; Jack Hines, Indiana; Henry Schotters, Illinois; Dick Moser, Tec Adhesives Co., Evanston, Ill.; John Laurenson, representative, Camp Co.; Bernie McCauley, John McCauley; Bob Moore, Tec Adhesives Co.; Fred Heidbrink, assistant distributor sales manager; and Richard J. O'Reilly, sales manager.*

## SHARON STEEL CREATES NEW CUSTOMER SERVICES DEPT.

Sharon Steel Corporation has established a new Customer Services Department within the Sales Department. W. J. McCune, general manager of sales, who made the annoucement, said the department will correlate the functions of the Service and Claims Departments.

G. B. Walls, who organized and managed Sharon's Service and Claims Departments, has been named manager of the new department. McCune also confirmed the appointment of Nick Fogoros as manager of the Service Department, and named H. M. Boyle manager of the Claims Department.

## JERVIS B. WEBB COMPANY ACQUIRES SPANMASTER CRANE

Jervis C. Webb, president of the Jervis B. Webb Co., announced the purchase of the Spanmaster Crane Co., producers of crane and monorail systems, with manufacturing facilities in Los Angeles.

Webb has also acquired 34,000 square feet of manufacturing facilities in Detroit, Mich. to provide production and office space to meet the requirements of Spanmaster customers located in the northeastern section of the United States. In addition, the southern area of the

*to Page 86* →

## A review of surface treatments of metal

*(Continued from Page 38)*

Both physical and exposure tests are used by our laboratories. The physical tests are classified roughly as: (1) Adhesion tests, such as knife adhesion and tape adhesion; (2) Flexibility with a mandrel; and (3) Impact. These tests are used to evaluate the coated panels and parts before, during, and after some type or types of exposure.

### Exposure test methods

Briefly tabulated, effective exposure tests fall under the following categories: 1. Thermal Exposure—Either elevated or depressed temperature or both. When both are used, it is a test for thermal shock.

2. Corrosion tests

a. *Water Immersion* — This is usually run at some specified temperature with tap, distilled or deionized water for some specific time interval. Sometimes aerated water is used. Failures that occur are blistering of the organic coating, or actual peeling. When aerated water is used, actual corrosion might occur.

b. *Fog Tests* — Humidity — This is usually run at 95% or 100% R.H. and 90° or 100°F. Test chambers similar to the salt spray are used. Failure in this test is also evidenced by blistering.

c. *Salt Spray* — This test has been both praised and condemned. The author believes, however, that if the results are interpreted properly, significant results are obtained. A 20% salt solution is used (ASTM has recently changed to a 5% salt solution, but Government Specifications are unchanged as yet). Panels to be tested are scribed with an "X" so that undercutting and poor adhesion can be observed. Most failures that occur in this test are undercutting, rusting and blistering.

d. *Cyclic exposure* — as the name implies, the coated parts are exposed to different conditions in a cycle, such as elevated temperature, then depressed temperature, then humidity. The cycling continues until failure occurs.

e. *Outdoor weathering* — The coated panels are placed on a test fence facing South and tilted at a 45 degree angle. A better test would be to expose the panels under actual conditions of use. Adhesion, flexibility and impact tests are conducted after the exposure. These tests provide more information than can be obtained from visual examination.

In brief summary, it should be noted that most of the surface treatments mentioned in this article are fully covered in available Government Specifications. These Specifications are listed in Table No. 1. For additional and more detailed information, consult the applicable ASTM standards, or field engineers associated with the various surface treating companies furnishing the required chemicals and supplies. The major purpose of this article has been to provide a comprehensive picture of the surface treating field as it exists today — a picture that is becoming more and more important in conjunction with the production of precision, high-quality painted metal products.

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## Characteristics of anodized aluminum

*(Continued from Page 45)*

same design as that used for high production electroplating.

### Performance testing

Included in the methods used for evaluating the performance of anodic finishes are several tests designed to determine relative resistance to corrosion. Two such tests involve exposure of test specimens outdoors and in salt spray cabinets.

Alloy 1100 specimens, chemically brightened and protected by 10-minute anodic oxidation at 12 amperes per square foot and 20-minute anodic oxidation at 12 amperes per square foot, were exposed for four years to the industrial atmosphere at New Kensington, Pa. Although no maintenance was used during the four year exposure period, these specimens showed great resistance to corrosion and retained a pleasing appearance at the completion of the test.

Salt spray exposure has been used to evaluate the corrosion resistance of anodic coatings on aluminum alloys for some time. Just as with electroplated finishes, it is difficult to correlate salt spray testing of anodic finishes with other performance data. With anodic coatings, care must be used since dissimilar metals which might be present in the testing cabinet can be carried over to the anodic finished surface and be responsible for pitting. To preclude this effect, it would be advantageous to restrict the cabinet for the testing of aluminum alloys only.

### Specifications and acceptance tests

As with any type of material or finish, good specifications are of utmost importance to establish and maintain uniform high quality. Appearance samples are a primary requirement. Such samples will provide visual standards for the specification of correct surface treatment. Both time and current density should be specified in conjunction with minimum coating thickness. If time alone is used, a processer can still produce in accordance with the specification; however, the coating thickness may be too low if he uses only half the current density required. For instance, an anodic oxidation time of 10-minutes at 12 amperes per square foot will produce a nominal coating thickness of .00015 inch. A 30-minute coating at the same current density results in a nominal coating thickness of .00045 inch. In general, the relation between time and thickness is linear to a 60-minute anodic oxidation time when the nominal coating thickness is .00090 inch.

All present information indicates that an anodic coating thickness in a range of .00015 inch and greater is satisfactory for many trim applications. In applications requiring the highest resistance to corrosion and abrasion, coating thickness greater than .00015 inch should be specified.

Coating weight is another important characteristic that should be specified, as it determines the resistance of the coating to abrasion. Where hard and dense coatings are required there should be an approximate coating weight of 7 milligrams per square inch for an anodic coating .00015 inch in thickness.

There are several reliable methods for testing the quality of anodic coatings. These include the following ASTM (American Society of Testing Material, 1916 Race St., Philadelphia, Pa.) designations and their applications: B110-45 —Thickness measurement; B137-45 — Coating weight measurement: B136-45 — Effectiveness of sealing treatment and B244-49T — Thickness measurement.

The most accurate coating thickness measurement is made by microscopic examination. This method is, of course, destructive of the surface.

### Maintenance

With any type of finish, the best performance is obtained with periodic cleaning and waxing. One important precaution should be observed in cleaning anodized aluminum surfaces. Strong, uninhibited, alkaline cleaners should not be used. The use of such harsh cleaners is not necessary since the anodized surface will clean satisfactorily with mild soap and water. Such cleaners are not only deleterious to the anodized finish, but they may also be harmful to lacquer or enamel finishes on appliances and other products.

## CURTAIN WALL MANUAL RELEASED BY PEI

The Porcelain Enamel Institute, according to John C. Oliver, managing director, has announced the availability of "Design Manual, Part Two, PORCELAIN IN ARCHITECTURE, Curtain Wall Construction."

The 28-page publication complements Part One in the series published in 1956 that covers veneer-type construction. Included in the new manual is a section on the definition and advantages of porcelain enamel curtain wall construction.

Immediate reaction to the colorful manual as it crossed the editorial desks at MPM was that it was a job magnificently done. Every detail from the scale drawings of the construction jobs depicted to the inspiring color photographs of the many large buildings that have porcelain enamel as an integral part of the structure were marvellously handled by the PEI and its contributors. Also included in the manual, in addition to the design factors such as building codes and joint design, are an impressive list of buildings that have porcelain enamel panels in the structure.



## Supplier news

→ *from Page 84*

country will be serviced by Spanmaster manufacturing facilities in the Webb-of-Georgia plant located in Atlanta. All three plants of the Spanmaster Crane Division will manufacture cranes and monorail systems with capacities ranging up to ten tons.

## TREND TO LARGER PORCELAIN ENAMELED INSULATED PANELS

A definite trend toward larger porcelain enamel panels has been observed in current building construction plans, according to J. F. Ingram, president of Ingram-Richardson Manufacturing Company.

"Current quotations as well as our discussions with architects and general contractors indicate clearly this trend toward larger sizes in insulated panels," he said. "Decided economies will be gained through use of big panels, since less horizontal and vertical framing is required. Also, less caulking or gasketing will be required, resulting in reduced chance of damage by weathering," he pointed out.

Ingram Richardson has supplied what are said to be the two largest one piece porcelain enamel insulated panels installed to date — a 4′ wide by 12′ high panel for a new office building at U. S. Steel's Homestead District Works, and a 7′ 10″ wide by 3′ 3″ high corrugated panel for the RCA Cherry Hill project.

Mr. Ingram stated that it is possible even now, with proper design, to produce a porcelain enamel panel 6′ x 10′ in one piece.

## GE WELDING DEPARTMENT TO TERMINATE BUSINESS

Plans for the gradual and orderly termination of the manufacture of all products by the General Electric Company's Welding Department were announced July 1 by Harold E. Strang, vice president and general manager of the Measurement and Industrial Products Division.

Strang emphasized that General Electric would continue to provide normal renewal parts and in-warranty service on all welding equipment now in the field or to be produced before termination of the business.

Products to be discontinued are presently manufactured in York, Pa., and include arc welding equipment and electrodes. This does not affect the manufacture of resistance welding control by General Electric's Specialty Control Department in Waynesboro, Va.

# ACP ANNOUNCES A NEW CHEMICAL PROCESS

## that develops an excellent zinc phosphate coating on mill passivated galvanized stock

ACP research and development has solved another perplexing problem for its customers in the galvanizing industry—the formation of a good zinc phosphate coating on mill passivated galvanized stock. It offers excellent paint bonding characteristics. The treatment is performed in a 5-stage power spray washer or dip line normally used for coating nonpassivated stock.

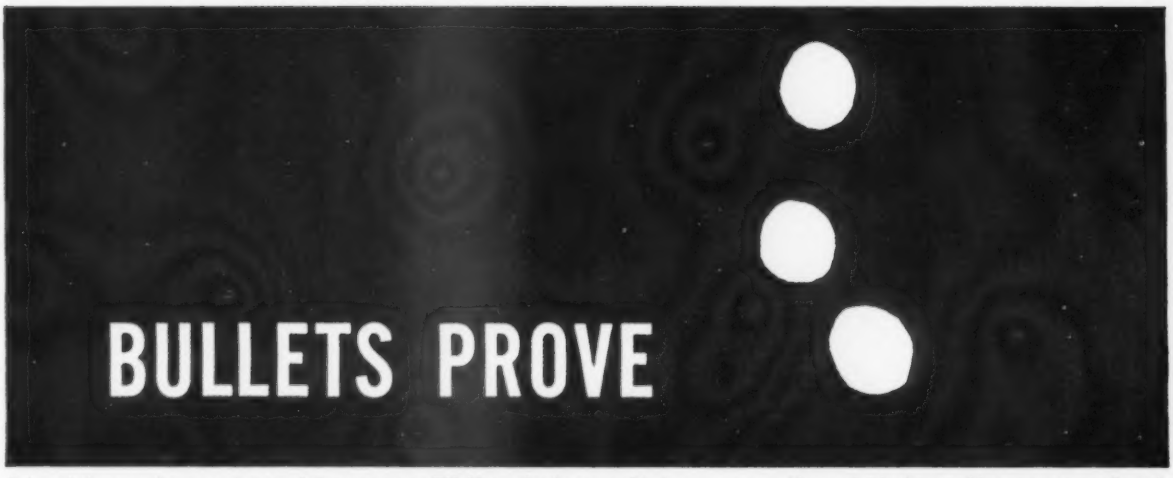
If you are having trouble getting a good zinc phosphate coating on your galvanized stock, consult us. We'll be glad to send you descriptive literature or have a technical representative call.

**AMERICAN CHEMICAL PAINT COMPANY, Ambler 33, Pa.**

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

*New Chemical Horizons for Industry and Agriculture*




Enlarged close-up of test panel shown below as seen on TV. Note: closely grouped holes . . . yet no evidence of chipping, cracking or exposure of metal.

# . . . that durable Du Pont Porcelain Enamels on aluminum won't crack or chip


• Commercials on two Du Pont national telecasts featured the rugged "bullet test" by Mrs. Thelma Anguish, big-game hunter and skeet champion, and John Kennedy, announcer for Du Pont. An estimated 14 million people saw each show.

Even the terrific impact of several bullets piercing this porcelain-enameled aluminum "target" could not crack or split the enamel! The ability of this material to take such punishment is due to the remarkable bond between the aluminum and Du Pont porcelain enamel . . . a product perfected after years of research and testing.

Du Pont porcelain enamel for aluminum stands up under a wide range of stresses . . . resists corrosion, abrasion, thermal shock, impact and flexing . . . can be sawed, sheared, drilled and punched without exposure of metal or spalling. And these rugged finishes, available in any unlimited assortment of colors and degrees of surface gloss, are easily applied with conventional equipment.

* * *

We can help you in the *design*, *finishing* or *production* of colorful porcelain-enameled aluminum products. For specific information and recommendations, call, or send the coupon below. We will be glad to put our years of experience to work for you.

**DU PONT**
**PORCELAIN ENAMELS**
**FOR ALUMINUM**

DUPONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, Wilmington 98, Delaware

☐ Please send me Technical Bulletin CP 4-454 and illustrated folder on Porcelain Enamel for Aluminum.
☐ Have your technical representative call with further details.

NAME_____ POSITION_____
FIRM_____
ADDRESS_____
CITY_____ STATE_____

Gaylord engineers conduct impact tests to simulate effects of sudden starts and stops on corrugated-packaged products.

# HOW PRE-TESTING CUTS SHIPPING DAMAGE

Gaylord Boxes

*Your product packaged by Gaylord can take its first trip over the road of distribution inside our laboratories. As a member of the National Safe Transit Program, Gaylord conducts unsparing tests duplicating the actual hazards of shipment.*

*This is only one phase of Gaylord engineering research which helps reduce shipping losses in every major American industry.*

*Make sure your boxes are performance-proved before they get their travel orders. Call your nearby Gaylord engineer. He likes tough challenges.*

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

# safe transit



## editorial voice of the national safe transit program

**devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.**

***255 LEADING MANUFACTURERS*** — representing an estimated 90% of major appliance production, plus other important fabricated metal products, are actively participating in the National Safe Transit voluntary co-operative program of pre-shipment testing. This means that these companies have installed the necessary testing equipment for checking their packaged products, or have had the safe transit tests conducted by one of the 60 certified safe transit laboratories.

In this and succeeding issues of MPM we plan to review the complete NST Program, test procedures and field results. Following its publication in MPM, all references to the publication will be deleted and the material will then be consolidated into booklet form for NST distribution.

### Nine years of progress

July 1957 marked the ninth anniversary of an editorial campaign in this publication, designed to awaken the appliance and metal products manufacturing industry to the multi-million dollar losses incurred annually through damage in shipment. In the July 1948 issue we said, "In this day of material shortages it would seem to approach criminal negligence to fabricate a much-needed appliance or metal product, finish it, assemble it, sell it and ship it, only to find that before the product reaches the ultimate consumer it is damaged beyond repair. . . . "

Since the first editorial from which these lines were quoted we have devoted hundreds of pages of space to this cause.

With what we hope will be considered a reasonable degree of modesty, this publication accepts credit for three phases of the co-operative program. *First, the conception of the idea* in our publication offices about nine years ago, an idea for attacking one of the "bug bears" of metal product distribution — *Second, the development of an organization outline* including representatives from the co-operative associations representing manufacturers of major appliances and allied products, carrier associations, and associations representing the producers of packaging and shipping materials — *Third, our publication has served as the "editorial voice"* for this co-operative-voluntary program for saving millions of dollars in shipping losses and for building customer good will.

### The real credit goes to others

The real credit for the development of a practical and workable pre-shipment testing program, based on technical knowledge and practical experience, plus the endless details involved in co-ordinating such a program goes to others. We approached the president of the sponsoring institute in early 1948 with the suggestion that the institute co-ordinate and sponsor the program, and we approached R. F. Bisbee and top executives at Westinghouse Electric Corporation, Mansfield, with the suggestion that Mr. Bisbee head such a program as general chairman. The present state of development of the National Safe Transit Program gives a ready answer to the willingness of these men and their respective organizations to co-operate wholeheartedly.

During the ensuing years, many of the leading organizations producing appliances and other metal products have served wholeheartedly and without pay on NST committees.

### The power behind the pre-testing program

In addition to the backing of individually certified companies, this first national pre-shipment testing program has had the backing of the leading associations affected by the plan. Included are the associations representing product manufacturers in the appliance and metal products field, the association representing all major modes of transportation, the associations representing container manufacturers, and the leading technical groups.

Packaging and shipping testing laboratories have been a most important aid to progress.

Various branches of the Government and armed services have recognized the pre-shipment test procedures in specifications.

When it is considered that the program to date has been solely the result of voluntary co-operative effort — including hundreds of hours of laboratory and field work, the special talent required for the development of color-sound movies and other educational material, time spent at various meetings by speakers bureau personnel, and the dozens of important published reports — the power of co-operative effort can be seen.

### A program for profit

Here is a project where everyone wins. Employing the safe transit tests results in reduced handling and shipping losses, improved packaging and materials handling procedures, improved quality checks, and in many, many cases, appreciable reduction in costs — thus affecting profit. *(There will be many case histories illustrated in the next few issues of* MPM.*)*

If you aren't on the NST "bandwagon" now, we suggest you contact the National Safe Transit Committee, 1145 Nineteenth Street, N.W., Washington 6, D. C., and get your packaged products certified at the earliest possible moment so that your company and its sales outlets may soon begin to benefit through participation in this fine program.

DANA CHASE
EDITOR AND PUBLISHER

# "BOOMERANGS"

## Reduced to a Minimum for

# VICTORY

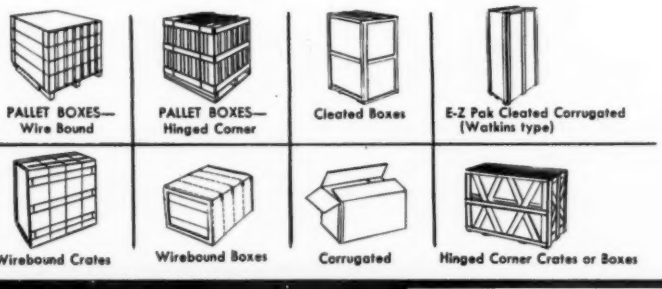
Damages on arrival cause "boomeranging" shipments! "Boomerangs" create loss of sales, time and confidence at your customers' level, and reduce your profits!

Victory Metal Products Corp., Plymouth Meeting, Pa., eliminated hidden damage by shipping their commercial refrigerators in CHICAGO MILL containers!

*Only Chicago Mill MAKES 'EM ALL — a complete line of containers for every shipping purpose!*

**FREE!**

Illustrated catalog describing the variety of CHICAGO MILL Containers!




CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street — Chicago 3, Illinois

**PLANTS**

- CHICAGO, ILLINOIS
- GREENVILLE, MISSISSIPPI
- HELENA, ARKANSAS
- ROCKMART, GEORGIA
- TALLULAH, LOUISIANA

## STATEMENT OF POLICY

**What the National Safe Transit Program means to shippers:**

"If you will test your packaged products by these test procedures, experience has shown that your loss and damage and your packaging costs will be acceptable minimums. It is up to each shipper to decide whether or not he will use these test procedures. The program is entirely voluntary and implies no connection with tariffs, freight rates, claim procedures or any other existing transit regulations."

**NATIONAL SAFE TRANSIT**
**1145 Nineteenth St., N.W., Washington 6, D. C.**

## FOREWORD

### STATEMENT FROM THE NATIONAL SAFE TRANSIT GENERAL CHAIRMAN

Until the development of the National Safe Transit Program, American industry wore a blindfold as far as safe shipping of its packaged products was concerned.

With the founding of National Safe Transit in August, 1948, this blindfold was removed, and now a proven program of standardization in this area is available to all of industry, which will benefit all shippers, carriers, dealers, workers and down to the customer.

The unique nature of the Safe Transit approach to the problem is the fact that it offers a basic approach to the final solution. In short, the approach to this solution is based on prevention rather than cure methods.

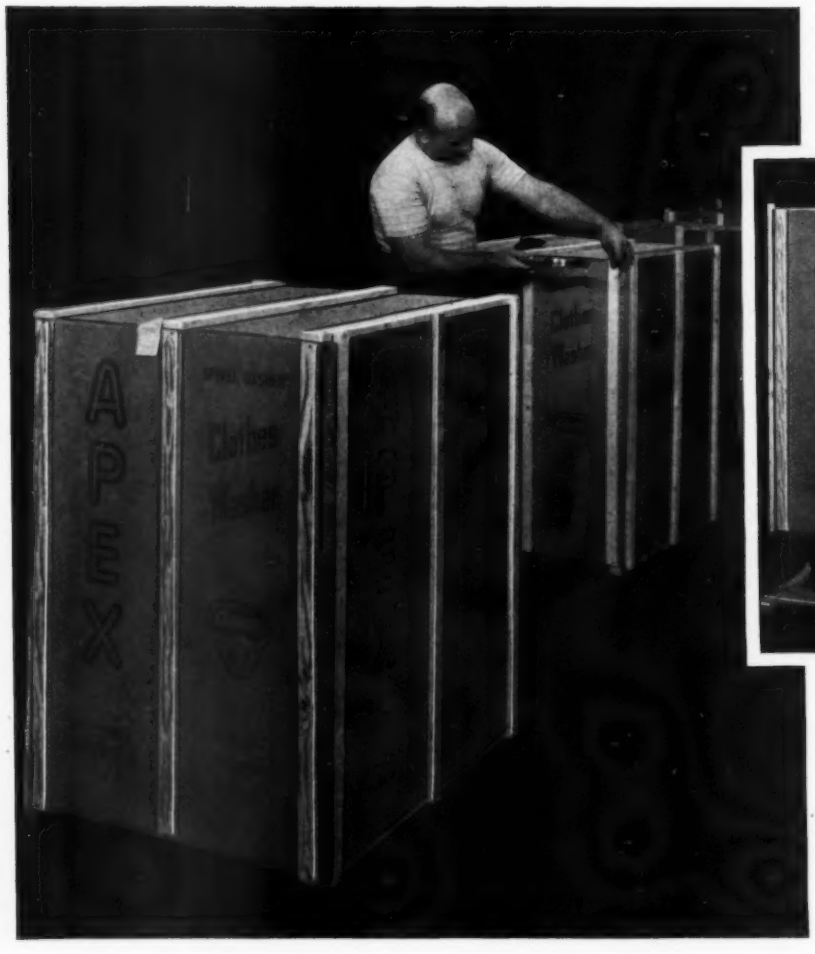
Long ago we learned the lesson of standardization and its benefits to producer and consumer alike. Standardization, in effect, became our way of life producing more and more goods for more and more people at lower costs.

As this is being written, National Safe Transit is entering its ninth year as a voluntary, cooperative, non-profit effort to combat damage being done to manufactured goods in transit. It is the first time in history that the carrier and industry groups have joined hands in a cooperative "two-way street" movement.

At the time of organization, little did we realize the additional benefits that this Program would render. Chronicled are the reports of many manufacturers who, by actual experience, have found National Safe Transit a boon to their profit statement by: reduced packing costs, better quality control, a tool for the design engineer, improved carrier and customer relations, and a vital sales aid. All of these things contribute to *profit*—both to carriers and to industry.

After reading the National Safe Transit story, we hope that you, too, will promote the Program. In so doing, you will be contributing toward removing the blindfold from the balance of industry now working blindly. You will also be contributing toward the economy in American industry as a whole.

*R. F. Bisbee*





After Ten Years of continuous use APEX Electrical Manufacturing Co. reports trouble-free service with

**WATKINS CONTAINERS**

# The Finest Products Go In Watkins Containers

**They are preferred because of:**

1. Low Cost
2. Stacking Strength
3. 75% Assembled–Upon Receipt
4. Ease of Assembly
5. Easy Handling
6. Minimum Storage Space
7. Protection from Dust and Dirt

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940 E. Michigan St., Indianapolis, Ind.

**HEMB & MARTIN MFG. CO.**
P.O. Box 108, Murfreesboro, Tennessee

**ILLINOIS BOX & CRATE CO.**
811 Center Street, Plainfield, Illinois

**KIECKHEFER BOX & LUMBER CO.**
1711 W. Canal St., Milwaukee 3, Wis.

**LEWISBURG CONTAINER CO.**
[illegible]

**LOVE MFG., INC.**
P.O. Box 546, Wichita, Kansas

**UTILITY CRATE CORPORATION**
2019 Imperial St., Los Angeles 21, Calif.

*Custom Protection . . .*

THE **WATKINS CONTAINER** MANUFACTURERS

# This nation-wide program is reducing packaging and shipping losses

**a voluntary cooperative program which is materially reducing both manufacturers' costs and in-transit damage and handling losses on packaged products in American industry**

AS a result of the monetary loss sustained by both shippers and carriers because of increased losses and claims during the late 1940's, the National Safe Transit Program was initiated. Nine years after the actual inception of a working Program under an organized group, evidence continues to pile up indicating how well the Program really works.

Today, manufacturers of a great diversity of products are participating in the pre-shipment testing plan established under the National Safe Transit Program. A very high percentage of the total production of major and small home appliances is now represented by these certified companies. Included also are manufacturers of such varied products as radios, television sets, transformers, vending machines, show cases, grinding wheels, typewriters, organs, furniture, and band instruments.

The Program, which is of a strictly voluntary and cooperative nature, has been acclaimed by manufacturers, packaging and materials handling engineers, laboratories, associations, and carrier groups, as a valuable contribution to the improvement and shipability of packaged finished products, and the reduction of packaging costs and shipping losses. The Program also furnishes a focal point around which all groups may cooperate.

### Basic objectives

The basic objectives of National Safe Transit include the expansion of a practical Program for reducing damage to packaged products during handling and while in transit, and enlisting the cooperation of manufacturers and carriers for putting such a Program into operation.

Industry's part in the cooperative Program consists of a proven preshipment testing plan that will pre-determine the ability of *packaged products* to withstand normal handling *from the production line to the consumer.*

National Safe Transit confines its activities to test procedures for *packaged products* only—neither the package nor the product is considered separately. It is not the Program's intent to interfere with the prerogative of the individual manufacturer in his design, fabrication or packaging techniques.

**PREMISE**

**All manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in damaged condition.**

Pre-shipment tests as devised will determine whether the *packaged product* will stand or fall on the performance of the whole. Structural strength built into an article to overcome inadequate packaging is costly and unreliable. Packaging strength sufficient to protect an article with a structural weakness is costly and undesirable. In both cases, transit damage will likely be excessive. A change in the package, a change in the product, or a change in both—made on the basis of tests established by National Safe Transit—are left wholly within the manufacturer's province.

### An investment that pays

Manufacturers not now using the testing plan may procure all necessary detailed information from the following pages. In brief, the manufacturer need install only two simple pieces of test equipment (vibration and impact) for products weighing 100 pounds or over, with a single instrument required for calibration purposes. For products weighing less than 100 lbs., a simple drop tester is all that is required in addition to the vibration tester. For less than a total of about $3,000, a manufacturer may install all needed equipment for conducting pre-shipment tests and for periodic control testing.

As an alternative, manufacturers may rely on establishing NST-certified laboratories for conducting the pre-shipment tests and certifying to the results.

In conducting the pre-shipment tests, the magnitude of the shocks imposed on a *packaged product* by ordinary hazards in handling and transportation can be accurately measured with the approved test equipment. The NST pre-shipment test procedures are based on the reproduction of these shocks in the manufacturer's plant or in the testing laboratory, and properly applied, they will reveal the "shipability" of the *packaged product.* These are strictly *performance tests.* The manufacturer must then determine for himself the causes of any failures—whether it is in his container, his product design, or both.

### The manufacturers' program

Project 1 covers pre-shipment tests for packaged units weighing 100 pounds or over. Project IA is for packaged units weighing less than 100 pounds. These projects are now being widely used by many manufacturers to effectively reduce their damage losses. Complete details of the plan for product manufacturers are presented in detailed description of the tests for Projects 1 and IA.

### Technical planning division sponsors field research

The Technical Planning Division of National Safe Transit was responsible for the development of the pre-shipment testing procedures, and conducts close follow-up of all applications for certification.

A Technical Sub-Committee sponsors extensive field projects in cooperation with all carriers—rail, truck, and air. Summarized results of typical tests have been published in booklet form: "What Happens to Your Product In Transit."*

### Loading research reports

The Loading Resarch Division has developed and published a complete set of recommendations for loading major

appliances in railroad cars: "Safe Transit—a Must for Home Appliances."** This booklet is complete with photographs and diagrams of recommended loading, bracing, blocking and unloading methods. The work of this Division serves as the test background for Safe Transit Project 1B—Test Procedures—Pre-Shipment Testing of Basic Carloading.

### Labels and car placards

The NST labeling plan forms an important link between the manufacturers, the carriers and the distributors and dealers in the loss reduction program.

*Originally published under copyright in the October, 1950, METAL PRODUCTS MANUFACTURING issue (formerly FINISH).
**Originally published under copyright in the April, May, and June, 1950 issues of METAL PRODUCTS MANUFACTURING (formerly FINISH).

NST labels on packaged products proclaim that the manufacturer has taken all necessary protective measures now known to shipping science to reduce damage losses on the products he ships. Labels are being used at the rate of 12 million per year.

### The carriers' program

The carriers responsible for handling the packaged products in transit, including railroads, truck lines and airlines, are playing an important part in the NST Program. In-transit research into the causes of damage, education of employees and handlers, and improvement of rolling stock are among the problems being tackled in an aggressive manner.

### Strictly cooperative

It should be stressed that the National Safe Transit Program is strictly a voluntary and cooperative Program. All of the technical research, testing and educational duties required of the working committees is executed by the individual members on their own or their respectivetive company's time without remuneration of any kind.

The remarkable progress of the Program is attributable to the efforts of this group and the wholehearted cooperation of the representatives of the cooperating associations.

Scores of manufacturers are now using the Safe Transit pre-shipment testing Program and many are the reports of tangible results in improved packing, reduced costs, and reduction in shipping losses.

## HANDBOOK OF POWERED INDUSTRIAL TRUCKS

The Industrial Truck Association, Washington, D. C. has announced that the long awaited "Handbook of Powered Industrial Trucks" will be published this fall. The 94-page handbook is the first such manual to cover all types of powered industrial trucks.

The book is divided into five sections covering selection, procedures and operation. Of particular interest is a 20-page section devoted to engineering data, said to be the most complete compendium of technical information on industrial trucks ever published. Advance orders may be placed at this time with the Industrial Truck Association, Ninth and F Streets, Washington. D. C. Price per copy is $5.00.

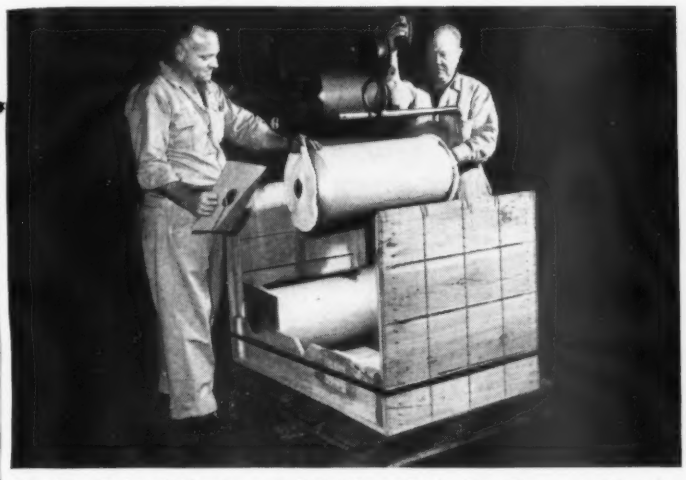
## MAGNESIUM RAMP-DOCK BOARD

A difficult underclearance problem on the shipping dock of the Century Electric Company, St. Louis, Missouri, manufacturer of electric motors and generators, was neatly solved by the use of this magnesium combination ramp-dock board. Low underclearance on their walkie trucks plus a larger than average height differential between the dock and carrier, prevented use of a standard dock board.

To handle the eight-inch height differential, an ordinary board would have too large a crown to permit travel of low underclearance walkie trucks. On the other hand, a long ramp suitable for low underclearance trucks would be bulky and hard to handle.

The use of this combination ramp-dock board, manufactured by the Lite-Line Industries Division of Copperloy Corporation, Cleveland, Ohio, provides an efficient solution. Built in two separate parts and fabricated from lightweight magnesium, it can be easily moved and positioned by one man. It provides the long gentle slope demanded by low underclearance equipment and since the parts can be easily separated, the dock board can be used independently at other locations where excessive height differential is not a factor.

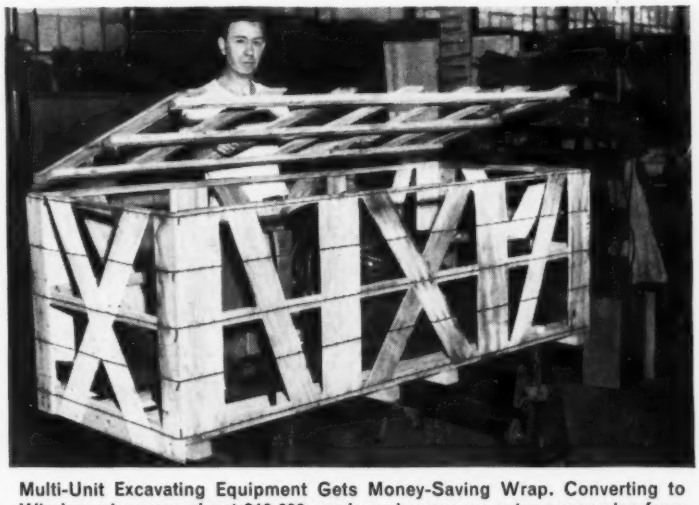
# PACKING NEWS FROM WIREBOUND



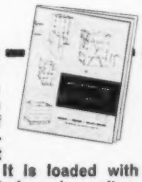
King Size Rolls of Aluminum Foil Get Royal Protection. Bumps and jars in domestic or export shipment of foil are absorbed by rugged Wirebounds. Unique construction available in Wirebounds gently cradles fragile and easily scratched spools of aluminum foil so that they are not touched by the box or other spools . . . they literally ride on air to their destination!

V-8 Service Crankcase Assembly is "Wrapped Up" in Wirebound. Now packing time is cut to 4 man-minutes. Pre-fabricated hexagonal shape eliminates interior braces or cushioning for a fast wrap. Savings in freight and warehousing are achieved because this shape permits interlocking four containers on a pallet instead of two—a steady base for high-stacking.

Burros Are "Packaged" for Shipment. Versatile Wirebounds protect every kind of item. When burros are shipped loose, they eat their own and each others"traveling papers" tied around their necks. The problem was solved by packing burros in Wirebounds with tags and waybills glued to the outside. Customers are happier, too—express rates are drastically lower, live delivery is guaranteed when burros are packaged in Wirebound containers.



Multi-Unit Excavating Equipment Gets Money-Saving Wrap. Converting to Wirebounds saves about $10,000 yearly and wraps up extra economies from reduced tare weight for shipment of complex power digging attachments. Two pre-fabricated Wirebounds—one for the basic unit, another for special adapter parts—eliminate container set-up time, cut packing man-time in half, reduce tare weight 40%, and save over-all packing costs by 30%.



FREE important advantages like these can be yours . . . write today for your copy of this informative booklet "What to Expect From Wirebounds". It is loaded with problem solving Wirebound applications. Better yet, talk over your requirements with a Wirebound Sales Engineer. Write us for either the book or the man.

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Room 1154, 327 S. La Salle St., Chicago 4, Ill.

***THERE'S ALWAYS SOMETHING NEW IN WIREBOUNDS***

## ADVERTISERS' INDEX





## Industry News

*from Page 73*

sion program of Proctor Electric Co., manufacturer of Mary Proctor housewares products (toasters, irons, ironing tables).

Formation of the Canadian company was announced by Walter M. Schwartz, Jr., Proctor president, who named Frank Martin, president of Frank Martin Company Limited, as general manager. Martin and his company, with headquarters in Toronto, have been exclusive Canadian sales representatives for Mary Proctor products.

The general manager of the new company located at 804 Mount Pleasant Road, Toronto, stated that all Proctor activity in Canada will be expanded, including advertising, merchandising, sales promotion, and authorized service stations.

### FURNITURE MAKERS GUILD SPONSORS SALES SEMINAR

Grand Rapids Furniture Makers Guild recently sponsored a Sales Seminar course including comprehensive training in fine furniture salesmanship plus plant visits and showroom tours.

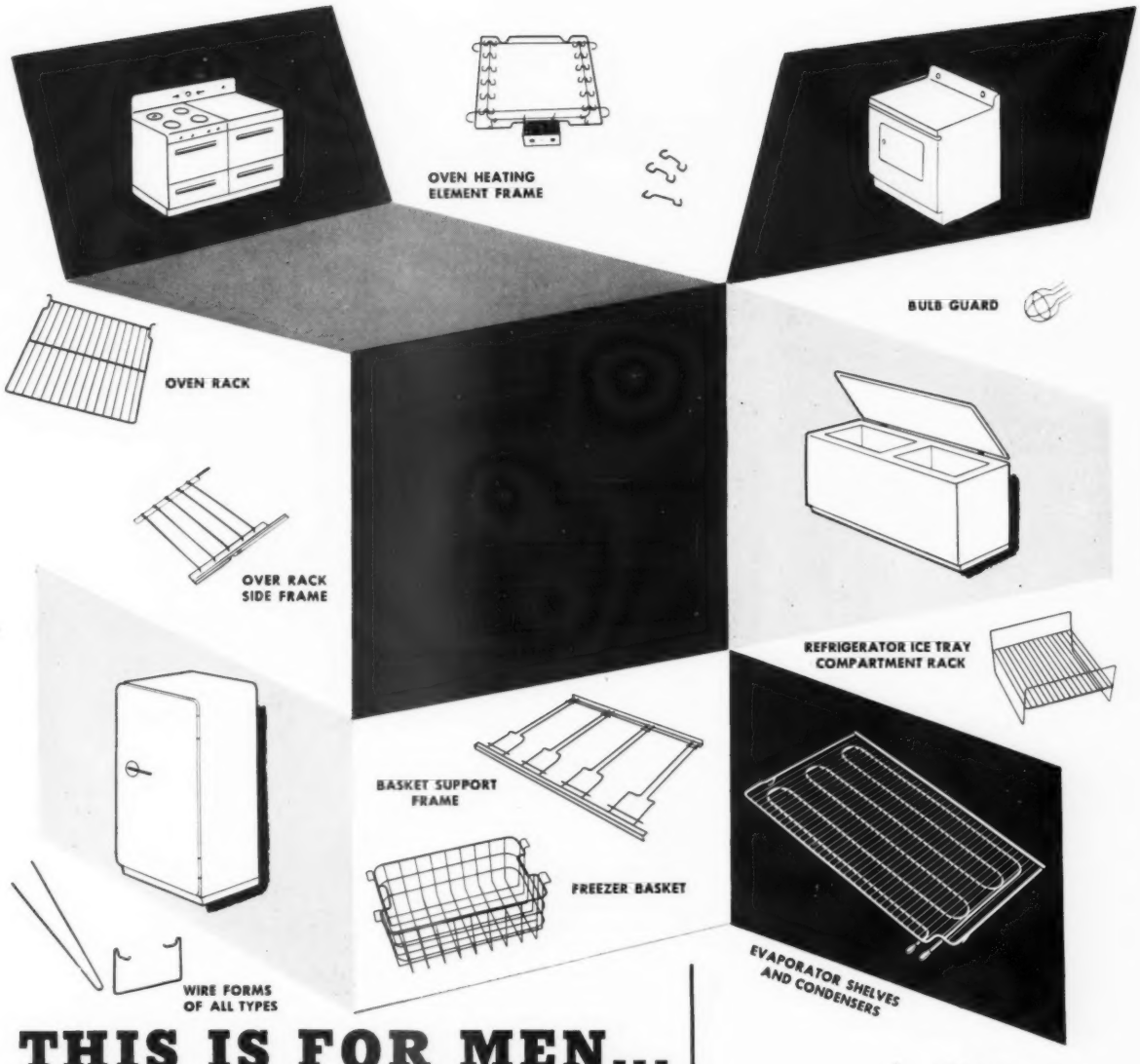
Hypothetical selling situations were established for group solution; lectures on construction, finishing and care, selling in the home, color and advertising were included as part of the curriculum.

Among the principal speakers for the Seminar were Sumner J. Robinson, managing director of the Grand Rapids Guild; Roland Brownlee, general marketing manager of Bigelow-Sandford; Joseph A. Hager, vice president and general sales manager of Grand Rapids Varnish Corp.; Mary C. Burke, merchandising editor of House & Garden; and C. Fred Charlton, vice president of Cunningham & Walsh Inc. advertising.

Another seminar, a week-long series of concentrated workshop periods and lectures, is scheduled for September 9th.

### WASTE KING HONORS HAGGARD

A. L. (Al) Haggard, national sales manager for Waste King Corporation, has been honored for 10 years service with the company. During this decade, the Los Angeles appliance manufacturer became the world's largest producer of household and commercial disposers. In recognition of his achievements, Haggard was presented a set of gold, disposer-shaped cuff links as "the sales manager of the first firm to produce one million disposers."




# THIS IS FOR MEN...

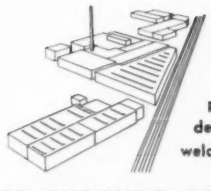
## ...Who are interested in the design, engineering and construction of modern appliances

Your product—your appliance *needs* wire. For modern wire is the preferred material because of its styling versatility, its strength, its lasting beauty and sound dependability. Wire—welded in the desired shape and size, plated in the finish desired, is basically essential to the appeal, the sale and the continuous satisfaction of your appliance.

Why not improve your appliance and eliminate production problems by selecting the one manufacturer who has specialized in producing quality welded wire products for half a century. Specify Union Steel...the *experienced* source that guarantees higher quality—plus on time delivery.

Need help? Union Steel's engineers will gladly assist you in planning and producing a welded wire part or assembly that will make your product more efficient.

Why not start by phoning Union Steel today?



385,000 square feet of modern plant facilities devoted to contract welded wire fabrication

**USP EXPANDS AGAIN... TO SERVE YOU BETTER ***

* *Union Steel's new plant which provides another 84,000 square feet of specialized wire fabricating, plating and shipping facilities.*

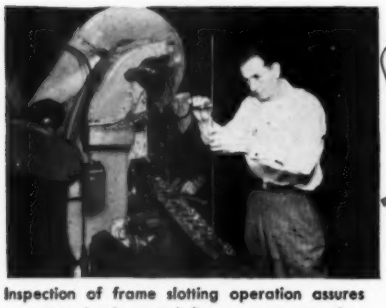
## UNION STEEL PRODUCTS CO. ALBION, MICHIGAN

*WIRE PRODUCTS DIVISION*

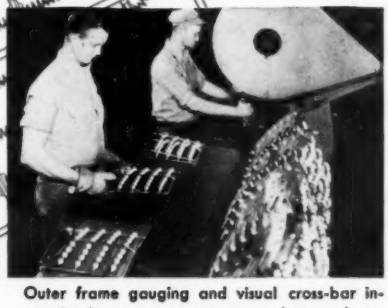
USP

# HOW TEP QUALITY CONTROL PAYS OFF...

***...PRODUCES BETTER OPEN-COIL HEATING ELEMENTS***



Inspection of frame slotting operation assures accurate depth control for necessary crossbar "breathing space."



Outer frame gauging and visual cross-bar inspection insure proper squareness in accordance with specs.

Shape gauging inspection is another step in "TEP" quality-control procedure that saves installation time and trouble.

Wire-threading and inspection operations are combined in "TEP" assembly-line procedure.

Final ohm inspection before packaging insures correct wattage and wire size. Each unit is high potentialled at 1700 volts.

## Exclusive Design Features Insure Long Service

- FLOATING FRAME CONSTRUCTION — "TEP" patented feature allows unit frame to breathe; flexibility lengthens frame life. Rigidly welded frames distort, or welds break.
- SURE-LOCK INSULATOR SUPPORTS — specially designed by "TEP" eliminate dislocating and subsequent electrical failures.
- SPECIALLY TREATED INSULATORS — reduce micro-amp leakage. "TEP" pioneered porosity-controlled steatite to assure longer life.
- SPECIAL NICKEL PLATING — exclusive "TEP" process assures a chrome-like finish, eliminates corrosion.

## 14-Point Assembly Line Inspection Saves You Time and Trouble

In the manufacture of "TEP" Open-Coil Heating Elements, progressive assembly line inspection has long been employed to assure a top quality product for appliance manufacturers. As illustrated, "TEP" quality control procedure employs 100% inspection of all units . . . is one of the major reasons why you save time and trouble in assembly and testing. There is a total of 14 inspection operations on the average "TEP-built" heating element. This method also insures maximum economy in manufacturing a quality product. For dependable performance, it pays to specify "TEP".

### Design and Engineering Assistance

When developing new or improving old units, we suggest that you take advantage of free "TEP" engineering and design service. Over 30 years of experience in electrical heating applications is available to you. *Phone or write today* for specialized assistance with any of your heating problems.

TEP Products

**TUTTLE ELECTRIC PRODUCTS, Inc.**

formerly Ferro Electric Products, Inc.

**KIRKLAND, ILLINOIS** **PHONE: 37**

**MANUFACTURERS OF OPEN COIL HEATING ELEMENTS, SWITCHES, SMALL DIE CASTINGS**